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# MINERAL-WATER INDUSTRY.

VOL. XXII—PART II.

REPORTS FROM CONSULS OF THE UNITED STATES IN ANSWER TO INSTRUCTIONS FROM THE DEPARTMENT OF STATE.

Issued from the Bureau of Foreign Commerce, Department of State.

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## CONTENTS.


Department instruction
Austria
Bohemia
Belgium
Denmark
France
Germany
Greece
Italy
Spain
Sweden
Norway
Switzerland
England
Ireland
Scotland
British India
Japan
Siberia
Turkey in Asia
- Syria
- Palestine
- Asia Minor

New South Wales
New Zealand
Victoria
Mexico




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# PUBLICATIONS OF THE BUREAU OF FOREIGN COMMERCE.*

The publications of the Bureau of Foreign Commerce, Department of State, are:

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II.—CONSULAR REPORTS, issued monthly, and containing miscellaneous reports from diplomatic and consular officers.

III.—ADVANCE SHEETS, CONSULAR REPORTS, issued daily, except Sundays and legal holidays, for the convenience of the newspaper press, commercial and manufacturing organizations, etc.

IV.—EXPORTS DECLARED FOR THE UNITED STATES, issued quarterly, and containing the declared values of exports from the various consular districts to the United States for the preceding three months.

V.—SPECIAL CONSULAR REPORTS, containing series of reports from consular officers on particular subjects, made in pursuance to instructions from the Department.

Following are the special publications issued by the Bureau prior to 1890:

Labor in Europe, 1878, one volume; Labor in Foreign Countries, 1884, three volumes; Commerce of the World and the Share of the United States Therein, 1879; Commerce of the World and the Share of the United States Therein, 1880–81; Declared Exports for the United States, First and Second Quarters, 1883; Declared Exports for the United States, Third and Fourth Quarters, 1883; Cholera in Europe in 1884, 1885; Trade Guilds of Europe, 1885; The Licorice Plant, 1885; Forestry in Europe, 1887; Emigration and Immigration, 1885–86 (a portion of this work was published as CONSULAR REPORTS No. 76, for the month of April, 1887); Rice Pounding in Europe, 1887; Sugar of Milk, 1887; Wool Scouring in Belgium, 1887; Cattle and Dairy Farming in Foreign Countries, 1888 (issued first in one volume, afterwards in two volumes); Technical Education in Europe, 1888; Tariffs of Central America and the British West Indies, 1890.

The editions of all these publications except Tariffs in Central America, etc., are exhausted and the Department is, therefore, unable to supply copies.

In 1890, the Department decided to publish reports on special subjects in separate form, to be entitled SPECIAL CONSULAR REPORTS. There are now the following SPECIAL CONSULAR REPORTS:

*Vol. 1 (1890).*—Cotton Textiles in Foreign Countries, Files in Spanish America, Carpet Manufacture in Foreign Countries, Malt and Beer in Spanish America, and Fruit Culture in Foreign Countries.

*Vol. 2 (1890 and 1891).*—Refrigerators and Food Preservation in Foreign Countries, European Emigration, Olive Culture in the Alpes Maritimes, and Beet-Sugar Industry and Flax Cultivation in Foreign Countries.

*Vol. 3 (1891).*—Streets and Highways in Foreign Countries. (New edition, 1897.)

*Vol. 4 (1891).*—Port Regulations in Foreign Countries.

*Vol. 5 (1891).*—Canals and Irrigation in Foreign Countries. (New edition, 1898.)

*Vol. 6 (1891 and 1892).*—Coal and Coal Consumption in Spanish America, Gas in Foreign Countries, and India Rubber.

*Vol. 7 (1892).*—The Stave Trade in Foreign Countries and Tariffs of Foreign Countries.

*Vol. 8 (1892).*—Fire and Building Regulations in Foreign Countries.

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* Formerly Bureau of Statistics. Name changed to Bureau of Foreign Commerce by order of the Secretary of State, July 1, 1897.

*Vol. 9 (1892 and 1893).*—Australian Sheep and Wool and Vagrancy and Public Charities in Foreign Countries.

*Vol. 10 (1894).*—Lead and Zinc Mining in Foreign Countries and Extension of Markets for American Flour. (New edition, 1897.)

*Vol. 11 (1894).*—American Lumber in Foreign Markets. (New edition, 1897.)

*Vol. 12 (1895).*—Highways of Commerce. (New edition, 1899.)

*Vol. 13 (1896 and 1897).*—Money and Prices in Foreign Countries.

*Vol. 14 (1898).*—The Drug Trade in Foreign Countries.

*Vol. 15 (1898).*—Part I. Soap Trade in Foreign Countries; Screws, Nuts, and Bolts in Foreign Countries; Argols in Europe, Rabbits and Rabbit Furs in Europe, and Cultivation of Ramie in Foreign Countries. Part II. Sericulture and Silk Reeling and Cultivation of the English Walnut.

*Vol. 16 (1899).*—Tariffs of Foreign Countries. Part I. Europe. Part II. America. Part III. Asia, Africa, Australasia, and Polynesia. Supplement (1900). Tariffs of Chile and Nicaragua.

*Vol. 17 (1899).*—Disposal of Sewage and Garbage in Foreign Countries; Foreign Trade in Coal Tar and By-Products.

*Vol. 18 (1900).*—Merchant Marine of Foreign Countries.

*Vol. 19 (1900).*—Paper in Foreign Countries; Uses of Wood Pulp.

*Vol. 20 (1900).*—Part I. Book Cloth in Foreign Countries, Market for Ready-Made Clothing in Latin America, Foreign Imports of American Tobacco, and Cigar and Cigarette Industry in Latin America. Part II. School Gardens in Europe. Part III. The Stave Trade in Foreign Countries.

*Vol. 21 (1900).*—Part I. Foreign Markets for American Coal. Part II. Vehicle Industry in Europe. Part III. Trusts and Trade Combinations in Europe.

*Vol. 22 (1900 and 1901).*—Part I. Acetic Acid in Foreign Countries. Part II. Mineral-Water Industry.

Of these SPECIAL CONSULAR REPORTS, Australian Sheep and Wool, Cotton Textiles in Foreign Countries; Disposal of Sewage, etc.; Files in Spanish America, Fire and Building Regulations, Gas in Foreign Countries, India Rubber, Lead and Zinc Mining, Malt and Beer in Spanish America, Port Regulations, Refrigerators and Food Preservation, Soap, etc.; Sericulture, etc.; Vagrancy, etc., are exhausted, and no copies can be supplied by the Department.

There was also published, in 1899, Proclamations and Decrees during the War with Spain, comprising neutrality circulars issued by foreign countries, proclamations by the President, orders of the War and Navy Departments, and war decrees of Spain.

Of the monthly CONSULAR REPORTS, many numbers are exhausted or so reduced that the Department is unable to accede to requests for copies. Of the publications of the Bureau available for distribution, copies are mailed to applicants without charge. In view of the scarcity of certain numbers, the Bureau will be grateful for the return of any copies of the monthly or special reports which recipients do not care to retain. Upon notification of willingness to return such copies, the Department will forward franking labels to be used in lieu of postage in the United States, Canada, the Hawaiian Islands, and Mexico.

Persons receiving CONSULAR REPORTS regularly, who change their addresses, should give the old as well as the new address in notifying the Bureau of the fact.

In order to prevent confusion with other Department bureaus, all communications relating to consular reports should be carefully addressed, "Chief, Bureau of Foreign Commerce, Department of State, Washington, U. S. A."

# VALUES OF FOREIGN COINS AND CURRENCIES.

The following statements show the valuation of foreign coins, as given by the Director of the United States Mint and published by the Secretary of the Treasury, in compliance with the first section of the act of March 3, 1873, viz: "That the value of foreign coins, as expressed in the money of account of the United States, shall be that of the pure metal of such coin of standard value," and that "the value of the standard coins in circulation of the various nations of the world shall be estimated annually by the Director of the Mint, and be proclaimed on the 1st day of January by the Secretary of the Treasury."

In compliance with the foregoing provisions of law, annual statements were issued by the Treasury Department, beginning with that issued on January 1, 1874, and ending with that issued on January 1, 1890. Since that date, in compliance with the act of October 1, 1890, these valuation statements have been issued quarterly, beginning with the statement issued on January 1, 1891.

The fact that the market exchange value of foreign coins differs in many instances from that given by the United States Treasury has been repeatedly called to the attention of the Bureau of Foreign Commerce. An explanation of the basis of the quarterly valuations was asked from the United States Director of the Mint, and under date of February 7, 1898, Mr. R. E. Preston made the following statement:

"When a country has the single gold standard, the value of its standard coins is estimated to be that of the number of grains fine of gold in them, 480 grains being reckoned equivalent to $20.67 in United States gold, and a smaller number of grains in proportion. When a country has the double standard, but keeps its full legal-tender silver coins at par with gold, the coins of both gold and silver are calculated on the basis of the gold value.

"The value of the standard coins of countries with the single silver standard is calculated to be that of the average market value of the pure metal they contained during the three months preceding the date of the proclamation of their value in United States gold by the Secretary of the Treasury. The value of the gold coins of silver-standard countries is calculated at that of the pure gold they contain, just as if they had the single gold standard.

"These valuations are used in estimating the values of all foreign merchandise exported to the United States."

The following statements, running from January 1, 1874, to January 1, 1901, have been prepared to assist in computing the values in American money of the trade, prices, values, wages, etc., of and in foreign countries, as given in consular and other reports. The series of years are given so that computations may be made for each year in the proper money values of such year. In hurried computations, the reductions of foreign currencies into American currency, no matter for how many years, are too often made on the bases of latest valuations. All computations of values, trade, wages, prices, etc., of and in the "fluctuating-currency countries" should be made in the values of their currencies in each year up to and including 1896, and in the quarterly valuations thereafter.

To meet typographical requirements, the quotations for the years 1875–1877, 1879–1882, and 1884–1887 are omitted, these years being selected as showing the least fluctuations when compared with years immediately preceding and following.

To save unnecessary repetition, the estimates of valuations are divided into three classes, viz: (A) countries with fixed currencies, (B) countries with fluctuating currencies, and (C) quarterly valuations of fluctuating currencies.

## A.—*Countries with fixed currencies.*

The following official (United States Treasury) valuations of foreign coins do not include "rates of exchange."

| Countries. | Standard. | Monetary unit. | Value in U.S. gold. | Coins. |
|---|---|---|---|---|
| Argentine Republic.. | Gold and silver.. | Peso..... | $0.96,5 | Gold—argentine ($4.82,4) and ½ argentine; silver—peso and divisions. |
| Austria-Hungary*..... | Gold ..... | Crown..... | .20,3 | Gold—20 crowns ($4.05,2) and 10 crowns. |
| Belgium ..... | Gold and silver.. | Franc..... | .19,3 | Gold—10 and 20 franc pieces; silver—5 francs. |
| Brazil..... | Gold ..... | Milreis..... | .54,6 | Gold—5, 10, and 20 milreis; silver—½, 1, and 2 milreis. |
| British North America (except Newfoundland). | .....do ..... | Dollar..... | 1.00 | |
| British Honduras..... | .....do ..... | .....do ..... | 1.00 | |
| Chile..... | .....do ..... | Peso..... | .36,5 | Gold—escudo ($1.25), doubloon ($3.65), and condor ($7.30); silver—peso and divisions. |
| Costa Rica..... | .....do ..... | Colon..... | .46,5 | Gold—2, 5, 10, and 20 colons; silver—5, 10, 25, and 50 centisimos. |
| Cuba ..... | Gold and silver.. | Peso..... | .92,6 | Gold—doubloon ($5.01,7); silver—peso (60 cents). |
| Denmark ..... | Gold ..... | Crown..... | .26,8 | Gold—10 and 20 crowns. |
| Egypt..... | .....do ..... | Pound (100 piasters). | 4.94,3 | Gold—10, 20, 50, and 100 piasters; silver—1, 2, 10, and 20 piasters. |
| Finland..... | .....do ..... | Mark..... | .19,3 | Gold—10 and 20 marks ($1.93 and $3.85,9). |
| France ..... | Gold and silver.. | Franc..... | .19,3 | Gold—5, 10, 20, 50, and 100 francs; silver—5 francs. |
| Germany ..... | Gold ..... | Mark..... | .23,8 | Gold—5, 10, and 20 marks. |
| Great Britain..... | .....do ..... ..... | Pound sterling... | 4.86,6½ | Gold—sovereign (pound sterling) and half sovereign. |
| Greece..... | Gold and silver.. | Drachma..... | .19,3 | Gold—5, 10, 20, 50, and 100 drachmas; silver—5 drachmas. |
| Haiti ..... | .....do ..... | Gourde..... | .96,5 | Silver—gourde. |
| India †..... | Gold ..... | Rupee..... | .32,4 | Gold—sovereign ($4.8665); silver—rupee and divisions. |
| Italy..... | Gold and silver.. | Lira ..... | .19,3 | Gold—5, 10, 20, 50, and 100 lire; silver—5 lire. |
| Japan ‡..... | Gold..... | Yen..... | .49,8 | Gold—1, 2, 5, 10, and 20 yen. |
| Liberia ..... | .....do ..... | Dollar..... | 1.00 | |
| Netherlands..... | Gold and silver.. | Florin ..... | .40,2 | Gold—10 florins; silver—½, 1, and 2½ florins. |
| Newfoundland ..... | Gold ..... | Dollar..... | 1.01,4 | Gold—$2 ($2.02,7). |
| Peru § ..... | .....do ..... | Sol ..... | .48,7 | Gold—libra ($4.8665); silver—sol and divisions. |
| Portugal..... | .....do ..... | Milreis..... | 1.08 | Gold—1, 2, 5, and 10 milreis. |
| Russia ¦..... | .....do ..... | Ruble..... | .51,5 | Gold—imperial ($7.718) and ½ imperial ($3.80); silver—¼, ½, and 1 ruble. |
| Spain..... | Gold and silver.. | Peseta..... | .19,3 | Gold—25 pesetas; silver—5 pesetas. |
| Sweden and Norway. | Gold ..... | Crown..... | .26,8 | Gold—10 and 20 crowns. |
| Switzerland ..... | Gold and silver.. | Franc..... | .19,3 | Gold—5, 10, 20, 50, and 100 francs; silver—5 francs. |
| Turkey ..... | Gold ..... | Piaster..... | .04,4 | Gold—25, 50, 100, 200, and 500 piasters. |
| Uruguay ..... | .....do ..... | Peso..... | 1.03,4 | Gold—peso; silver—peso and divisions. |
| Venezuela..... | Gold and silver.. | Bolivar..... | .19,3 | Gold—5, 10, 20, 50, and 100 bolivars; silver—5 bolivars. |

* The gold standard went into effect January 1, 1900 (see Commercia Relations, 1899, Vol. II, p. 7). Values are still sometimes expressed in the florin, which is worth 2 crowns.

† For an account of the adoption of the gold standard, see CONSULAR REPORTS No. 238, p. 359.

‡ Gold standard adopted October 1, 1897. (See CONSULAR REPORTS No. 201, p. 259.)

§ Gold standard adopted October 13, 1900.

¦ For an account of the adoption of the gold standard, see Review of the World's Commerce, 1896-97, p. 254.

B.—*Countries with fluctuating currencies, 1874–1896.*

| Countries. | Standard. | Monetary unit. | Value in terms of the United States gold dollar on January 1— | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1874. | 1878. | 1883. | 1888. | 1889. | 1890. |
| Austria-Hungary*. | Silver..... | Florin..... | $0.47,6 | $0.45,3 | $0.40,1 | $0.34,5 | $0.33,6 | $0.42 |
| Bolivia..... | .....do..... | Dollar until 1880; boliviano thereafter. | .96,5 | .96,5 | .81,2 | .69,9 | .68 | .85 |
| Central America.... | .....do..... | Peso..... | .96,5 | .91,8 | ..... | .69,9 | .68 | .85 |
| China..... | .....do ..... | Haikwan tael.. | 1.61 | ..... | ..... | ..... | ..... | ..... |
| Colombia..... | .....do..... | Peso..... | .96,5 | .96,5 | .81,2 | .69,9 | .68 | .85 |
| Ecuador..... | .....do..... | .....do..... | .96,5 | .91,8 | .81,2 | .69,9 | .68 | .85 |
| Egypt†..... | Gold..... | Pound (100 piasters). | ..... | 4.97,4 | 4.90 | 4.94,3 | ..... | ..... |
| India..... | Silver..... | Rupee..... | .45,8 | .43,6 | .38,6 | .32,2 | .32,3 | .40,4 |
| Japan..... | Gold..... | Yen..... | .99,7 | .99,7 | ..... | .99,7 | .99,7 | .99,7 |
| | Silver..... | | ..... | ..... | .87,6 | .75,3 | .73,4 | .91,7 |
| Mexico..... | .....do..... | Dollar..... | 1.04,7½ | .99,8 | .88,2 | .75,9 | .73,9 | .92,3 |
| Netherlands‡..... | Gold and Silver. | Florin..... | .40,5 | .38,5 | ..... | ..... | ..... | ..... |
| Peru..... | Silver..... | Sol..... | .92,5 | .91,8 | .81,2 | .69,9 | .68 | .85 |
| Russia..... | .....do..... | Ruble..... | .77,17 | .73,4 | .65 | .55,9 | .54,4 | .68 |
| Tripoli..... | .....do..... | Mahbub of 20 piasters. | .87,09 | .82,9 | .73,3 | .63 | .61,4 | .76,7 |

| Countries. | Standard. | Monetary unit. | Value in terms of the United States gold dollar on January 1— | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1891. | 1892. | 1893. | 1894. | 1895. | 1896. |
| Austria-Hungary*. | Silver..... | Florin..... | $0.38,1 | $0.34,1 | ..... | ..... | ..... | ..... |
| Bolivia..... | .....do..... | Boliviano ..... | .77,1 | .69,1 | $0.61,3 | $0.51,6 | $0.45,5 | $0.49,1 |
| Central America.... | .....do..... | Peso..... | .77,1 | .69,1 | .61,3 | .51,6 | .45,5 | .49,1 |
| Colombia..... | .....do..... | .....do..... | .77,1 | .69,1 | .61,3 | .51,6 | .45,5 | .49,1 |
| Ecuador..... | .....do..... | .....do..... | .77,1 | .69,1 | .61,3 | .51,6 | .45,5 | .49,1 |
| India..... | .....do..... | Rupee..... | .36,6 | .32,8 | .29,2 | .24,5 | .21,6 | .23,3 |
| Japan..... | .....do..... | Yen..... | .83,1 | .74,5 | .66,1 | .55,6 | .49,1 | .52,9 |
| Mexico..... | .....do..... | Dollar..... | .83,7 | .75 | .66,6 | .56 | .49,5 | .53,3 |
| Peru..... | .....do..... | Sol..... | .77,1 | .69,1 | .61,3 | .51,6 | .45,5 | .49,1 |
| Russia..... | .....do..... | Ruble..... | .61,7 | .55,3 | .49,1 | .41,3 | .36,4 | .39,3 |
| Tripoli..... | .....do..... | Mahbub of 20 piasters. | .69,5 | .62,3 | .55,3 | .46,5 | .41,1 | .44,3 |

* The silver standard prevailed in Austria-Hungary up to 1892. The law of August 2 of that year (see CONSULAR REPORTS No. 147, p. 623) established the gold standard.

† The Egyptian pound became fixed in value at $4.94,3 in 1887.

‡ The Netherlands florin fluctuated up to the year 1880, when it became fixed at 40.2 cents.

C.—*Quarterly valuations of fluctuating currencies.*

| Countries. | Monetary unit. | 1898. | | | | 1899. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Jan. 1. | April 1. | July 1. | Oct. 1. | Jan. 1. | April 1. | July 1. | Oct. 1. |
| Bolivia | Silver boliviano. | $0.42,4 | $0.40,9 | $0.41,8 | $0.43,6 | $0.43,9 | $0.43,4 | $0.44,3 | $0.43,6 |
| Central America. | Silver peso | .41,4 | .40,9 | .41,8 | .43,6 | .43,9 | .43,4 | .44,3 | .43,6 |
| China | Amoy tael | .68,5 | .66,2 | .67,6 | .70,6 | .71 | .70,2 | .71,6 | .70,5 |
| | Canton tael | .68,3 | .66 | .67,4 | .70,4 | .70,8 | .70 | .71,4 | .70,3 |
| | Chefoo tael | .65,5 | .63,3 | .64,6 | .67,5 | .67,9 | .67,2 | .68,4 | .67,4 |
| | Chinkiang tael | .66,9 | .64,6 | .66 | .69 | .69,3 | .68,6 | .69,9 | .68,9 |
| | Fuchau tael | .63,4 | .61,2 | .62,5 | .65,3 | .65,6 | .65 | .66,2 | .65,2 |
| | Haikwan tael | .69,7 | .67,3 | .68,8 | .71,8 | .72,2 | .71,4 | .72,8 | .71,8 |
| | Hankau tael | .64,1 | .61,9 | .63,2 | .66 | .66,4 | .65,7 | .67 | .66 |
| | Hongkong tael | (*) | (*) | (*) | (*) | (*) | (*) | (*) | (*) |
| | Ningpo tael | .64,3 | .63 | .65 | .67,9 | .68,2 | .67,5 | .68,8 | .67,8 |
| | Niuchwang tael | .65,9 | .62 | .63,4 | .66,2 | .66,5 | .65,9 | .67,1 | .66,1 |
| | Shanghai tael | .62,6 | .60,4 | .61,7 | .64,5 | .64,8 | .64,1 | .65,4 | .64,4 |
| | Swatow tael | .63,3 | .61,1 | .62,4 | .65,2 | .65,5 | .64,9 | .66,1 | .65,1 |
| | Takao tael | .66 | .66,6 | .68 | .71 | .71,4 | .70,7 | .72 | .71 |
| | Tientsin tael | .66,4 | .64,1 | .65,5 | .68,4 | .68,8 | .68 | .69,4 | .68,3 |
| Colombia | Silver peso | .42,4 | .40,9 | .41,8 | .43,6 | .43,9 | .43,4 | .44,3 | .43,6 |
| Ecuador | do | .42,4 | .40,9 | .41,8 | .43,6 | .43,9 | .43,4 | .44,3 | .43,6 |
| India | Silver rupee† | .20,1 | .19,1 | .19,9 | .20,7 | .20,8 | .20,6 | .21 | .20,7 |
| Mexico | Silver dollar | .46 | .44,4 | .45,4 | .47,4 | .47,7 | .47,2 | .48,1 | .47,4 |
| Persia | Silver kran | .07,8 | .07,5 | .07,7 | .08 | .08,1 | .08 | .08,2 | .08 |
| Peru | Silver sol | .42,4 | .40,9 | .41,8 | .43,6 | .43,9 | .43,4 | .44,3 | .43,6 |

| Countries. | Monetary unit. | 1900. | | | | 1901. |
|---|---|---|---|---|---|---|
| | | Jan. 1. | April 1. | July 1. | Oct. 1. | Jan. 1. |
| Bolivia | Silver boliviano. | $0.42,7 | $0.43,6 | $0.43,8 | $0.45,1 | $0.46,8 |
| Central America | Silver peso | .42,7 | .43,6 | .43,8 | .45,1 | .46,5 |
| China | Amoy tael | .69,1 | .70,5 | .70,9 | .72,9 | .75,7 |
| | Canton tael | .68,9 | .70,3 | .70,7 | .72,7 | .75,5 |
| | Chefoo tael | .66,1 | .67,4 | .67,8 | .69,7 | .72,4 |
| | Chinkiang tael | .67,5 | .68,8 | .69,3 | .71,2 | .74 |
| | Fuchau tael | .64 | .65,2 | .65,6 | .67,4 | .70,1 |
| | Haikwan tael | .70,3 | .71,7 | .72,1 | .74,2 | .77,1 |
| | Hankau tael | .64,7 | .65,9 | .66,3 | .68,2 | .70,9 |
| | Hongkong tael | (*) | (*) | (*) | (*) | (*) |
| | Ningpo tael | .66,5 | .67,7 | .68,2 | .70,1 | .72,8 |
| | Niuchwang tael | .64,8 | .66,1 | .66,5 | .68,4 | .71 |
| | Shanghai tael | .63,1 | .64,4 | .64,8 | .66,6 | .69,2 |
| | Swatow tael | .63,9 | .65,1 | .65,5 | .67,4 | .70 |
| | Takao tael | .69,6 | .70,9 | .71,4 | .73,4 | .76,2 |
| | Tientsin tael | .67 | .68,3 | .68,7 | .70,7 | .73,4 |
| Colombia | Silver peso | .42,7 | .43,6 | .43,8 | .45,1 | .46,8 |
| Ecuador | do | .42,7 | .43,6 | .43,8 | .45,1 | .46,8 |
| India | Silver rupee† | .20,3 | .20,7 | .20,8 | ..... | ..... |
| Mexico | Silver dollar | .46,4 | .47,3 | .47,6 | .49,0 | .50,9 |
| Persia | Silver kran | .07,9 | .08 | .08,1 | .08,3 | .08,6 |
| Peru | Silver sol | .42,7 | .43,6 | .43,8 | .48,7 | ..... |

* The "British dollar" has the same legal value as the Mexican dollar in Hongkong, the Straits Settlements, and Labuan.

† The sovereign is the standard coin of India, but the rupee is the money of account.

# FOREIGN WEIGHTS AND MEASURES.

The following table embraces only such weights and measures as are given from time to time in CONSULAR REPORTS and in Commercial Relations:

*Foreign weights and measures, with American equivalents.*

| Denominations. | Where used. | American equivalents. |
|---|---|---|
| Almude | Portugal | 4.422 gallons. |
| Ardeb | Egypt | 7.6907 bushels. |
| Are | Metric | 0.02471 acre. |
| Arobe | Paraguay | 25 pounds. |
| Arratel or libra | Portugal | 1.011 pounds. |
| Arroba (dry) | Argentine Republic | 25.3175 pounds. |
| Do | Brazil | 32.38 pounds. |
| Do | Cuba | 25.3664 pounds. |
| Do | Portugal | 32.38 pounds. |
| Do | Spain | 25.36 pounds. |
| Do | Venezuela | 25.4024 pounds. |
| Arroba (liquid) | Cuba, Spain, and Venezuela | 4.263 gallons. |
| Arshine | Russia | 28 inches. |
| Arshine (square) | do | 5.44 square feet. |
| Artel | Morocco | 1.12 pounds. |
| Baril | Argentine Republic and Mexico | 20.0787 gallons. |
| Barrel | Malta (customs) | 11.4 gallons. |
| Do | Spain (raisins) | 100 pounds. |
| Berkovets | Russia | 361.12 pounds. |
| Bongkal | India | 832 grains. |
| Bouw | Sumatra | 7,096.5 square meters. |
| Bu | Japan | 0.1 inch. |
| Butt (wine) | Spain | 140 gallons. |
| Caffiso | Malta | 5.4 gallons. |
| Candy | India (Bombay) | 529 pounds. |
| Do | India (Madras) | 500 pounds. |
| Cantar | Morocco | 113 pounds. |
| Do | Syria (Damascus) | 575 pounds. |
| Do | Turkey | 124.7036 pounds. |
| Cantaro (cantar) | Malta | 175 pounds. |
| Carga | Mexico and Salvador | 300 pounds. |
| Catty | China | 1.333⅓ (1⅓) pounds. |
| Do* | Japan | 1.31 pounds. |
| Do | Java, Siam, and Malacca | 1.35 pounds. |
| Do | Sumatra | 2.12 pounds. |
| Centaro | Central America | 4.2631 gallons. |
| Centner | Bremen and Brunswick | 117.5 pounds. |
| Do | Darmstadt | 110.24 pounds. |
| Do | Denmark and Norway | 110.11 pounds. |
| Do | Nuremberg | 112.43 pounds. |
| Do | Prussia | 113.44 pounds. |
| Do | Sweden | 93.7 pounds. |
| Do | Vienna | 123.5 pounds. |
| Do | Zollverein | 110.24 pounds. |
| Do | Double or metric | 220.46 pounds. |
| Chih | China | 14 inches. |

*More frequently called "kin." Among merchants in the treaty ports it equals 1.33⅓ pounds avoirdupois.

*Foreign weights and measures, with American equivalents*—Continued.

| Denominations. | Where used. | American equivalents. |
|---|---|---|
| Coyan | Sarawak | 3,098 pounds. |
| Do | Siam (Koyan) | 2,667 pounds. |
| Cuadra | Argentine Republic | 4.2 acres. |
| Do | Paraguay | 78.9 yards. |
| Do | Paraguay (square) | 8.077 square feet. |
| Do | Uruguay | Nearly 2 acres. |
| Cubic meter | Metric | 35.3 cubic feet. |
| Cwt. (hundredweight) | British | 112 pounds. |
| Dessiatine | Russia | 2.6997 acres. |
| Do | Spain | 1.599 bushels. |
| Drachme | Greece | Half ounce. |
| Egyptian weights and measures | (*See* CONSULAR REPORTS No. 144.) | |
| Fanega (dry) | Central America | 1.5745 bushels. |
| Do | Chile | 2.575 bushels. |
| Do | Cuba | 1.599 bushels. |
| Do | Mexico | 1.54728 bushels. |
| Do | Morocco | Strike fanega, 70 lbs.; full fanega, 118 lbs. |
| Do | Uruguay (double) | 7.776 bushels. |
| Do | Uruguay (single) | 3.888 bushels. |
| Do | Venezuela | 1.599 bushels. |
| Fanega (liquid) | Spain | 16 gallons. |
| Feddan | Egypt | 1.03 acres. |
| Frail (raisins) | Spain | 50 pounds. |
| Frasco | Argentine Republic | 2.5096 quarts. |
| Do | Mexico | 2.5 quarts. |
| Frasila | Zanzibar | 35 pounds. |
| Fuder | Luxemburg | 264.17 gallons. |
| Garnice | Russian Poland | 0.88 gallon. |
| Gram | Metric | 15.432 grains. |
| Hectare | do | 2.471 acres. |
| Hectoliter: | | |
| Dry | do | 2.838 bushels. |
| Liquid | do | 26.417 gallons. |
| Joch | Austria-Hungary | 1.422 acres. |
| Ken | Japan | 6 feet. |
| Kilogram (kilo) | Metric | 2.2046 pounds. |
| Kilometer | do | 0.621376 mile. |
| Klafter | Russia | 216 cubic feet. |
| Koku | Japan | 4.9629 bushels. |
| Korrec | Russia | 3.5 bushels. |
| Kwan | Japan | 8.28 pounds. |
| Last | Belgium and Holland | 85.134 bushels. |
| Do | England (dry malt) | 82.52 bushels. |
| Do | Germany | 2 metric tons (4,480 pounds). |
| Do | Prussia | 112.29 bushels. |
| Do | Russian Poland | 113⅜ bushels. |
| Do | Spain (salt) | 4,760 pounds. |
| League (land) | Paraguay | 4,633 acres. |
| Li | China | 2,115 feet. |
| Libra (pound) | Argentine Republic | 1.0127 pounds. |
| Do | Central America | 1.043 pounds. |
| Do | Chile | 1.014 pounds. |
| Do | Cuba | 1.0161 pounds. |
| Do | Mexico | 1.01465 pounds. |
| Do | Peru | 1.0143 pounds. |
| Do | Portugal | 1.011 pounds. |
| Do | Spain | 1.0144 pounds. |
| Do | Uruguay | 1.0143 pounds. |
| Do | Venezuela | 1.0161 pounds. |
| Liter | Metric | 1.0567 quarts. |

*Foreign weights and measures, with American equivalents*—Continued.

| Denominations. | Where used. | American equivalents. |
|---|---|---|
| Livre (pound) | Greece | 1.1 pounds. |
| Do | Guiana | 1.0791 pounds. |
| Load | England (timber) | Square, 50 cubic feet; unhewn, 40 cubic feet; inch planks, 600 superficial feet. |
| Manzana | Costa Rica | 1⅞ acres. |
| Do | Nicaragua and Salvador | 1.727 acres. |
| Marc | Bolivia | 0.507 pound. |
| Maund | India | 82⅔ pounds. |
| Meter | Metric | 39.37 inches. |
| Mil | Denmark | 4.68 miles. |
| Do | Denmark (geographical) | 4.61 miles. |
| Milla | Nicaragua and Honduras | 1.1493 miles. |
| Morgen | Prussia | 0.63 acre. |
| Oke | Egypt | 2.7225 pounds. |
| Do | Greece | 2.84 pounds. |
| Do | Hungary | 3.0817 pounds. |
| Do | Turkey | 2.85418 pounds. |
| Do | Hungary and Wallachia | 2.5 pints. |
| Pic | Egypt | 21¼ inches. |
| Picul | Borneo and Celebes | 135.64 pounds. |
| Do | China, Japan, and Sumatra | 133⅓ pounds. |
| Do | Java | 135.1 pounds. |
| Do | Philippine Islands | 137.9 pounds. |
| Pie | Argentine Republic | 0.9478 foot. |
| Do | Spain | 0.91407 foot. |
| Pik | Turkey | 27.9 inches. |
| Pood | Russia | 36.112 pounds. |
| Pund (pound) | Denmark and Sweden | 1.102 pounds. |
| Quarter | Great Britain | 8.252 bushels. |
| Do | London (coal) | 36 bushels. |
| Quintal | Argentine Republic | 101.42 pounds. |
| Do | Brazil | 130.06 pounds. |
| Do | Castile,* Chile, Mexico, and Peru | 101.41 pounds. |
| Do | Greece | 123.2 pounds. |
| Do | Newfoundland (fish) | 112 pounds. |
| Do | Paraguay | 100 pounds. |
| Do | Syria | 125 pounds. |
| Do | Metric | 220.46 pounds. |
| Rottle | Palestine | 6 pounds. |
| Do | Syria | 5¾ pounds. |
| Sagen | Russia | 7 feet. |
| Salm | Malta | 490 pounds. |
| Se | Japan | 0.02451 acres. |
| Seer | India | 1 pound 13 ounces. |
| Shaku | Japan | 11.9305 inches. |
| Sho | ....do | 1.6 quarts. |
| Standard (St. Petersburg) | Lumber measure | 165 cubic feet. |
| Stone | British | 14 pounds. |
| Suerte | Uruguay | 2,700 cuadras (see cuadra). |
| Sun | Japan | 1.193 inches. |
| Tael | Cochin China | 590.75 grains (troy). |
| Tan | Japan | 0.25 acre. |
| To | ....do | 2 pecks. |
| Ton | Space measure | 40 cubic feet. |
| Tonde (cereals) | Denmark | 3.94783 bushels. |
| Tondeland | ....do | 1.36 acres. |
| Tsubo | Japan | 6 feet square. |

*Although the metric weights are used officially in Spain, the Castile quintal is employed in commerce in the Peninsula and colonies, save in Catalonia; the Catalan quintal equals 91.71 pounds.

*Foreign weights and measures, with American equivalents*—Continued.

| Denominations. | Where used. | American equivalents. |
|---|---|---|
| Tsun | China | 1.41 inches. |
| Tunna | Sweden | 4.5 bushels. |
| Tunnland | Sweden | 1.22 acres. |
| Vara | Argentine Republic | 34.1208 inches. |
| Do | Central America | 32.87 inches. |
| Do | Chile and Peru | 33.367 inches. |
| Do | Cuba | 33.384 inches. |
| Do | Curaçao | 33.375 inches. |
| Do | Mexico | 33 inches. |
| Do | Paraguay | 34 inches. |
| Do | Spain | 0.914117 yard. |
| Do | Venezuela | 33.384 inches. |
| Vedro | Russia | 2.707 gallons. |
| Vergees | Isle of Jersey | 71.1 square rods. |
| Verst | Russia | 0.663 mile. |
| Vlocka | Russian Poland | 41.98 acres. |

## METRIC WEIGHTS AND MEASURES.

### *Metric weights.*

Milligram ($\frac{1}{1000}$ gram) equals 0.0154 grain.
Centigram ($\frac{1}{100}$ gram) equals 0.1543 grain.
Decigram ($\frac{1}{10}$ gram) equals 1.5432 grains.
Gram equals 15.432 grains.
Decagram (10 grams) equals 0.3527 ounce.
Hectogram (100 grams) equals 3.5274 ounces.
Kilogram (1,000 grams) equals 2.2046 pounds.
Myriagram (10,000 grams) equals 22.046 pounds.
Quintal (100,000 grams) equals 220.46 pounds.
Millier or tonnea—ton (1,000,000 grams) equals 2,204.6 pounds.

### *Metric dry measures.*

Milliliter ($\frac{1}{1000}$ liter) equals 0.061 cubic inch.
Centiliter ($\frac{1}{100}$ liter) equals 0.6102 cubic inch.
Deciliter ($\frac{1}{10}$ liter) equals 6.1022 cubic inches.
Liter equals 0.908 quart.
Decaliter (10 liters) equals 9.08 quarts.
Hectoliter (100 liters) equals 2.838 bushels.
Kiloliter (1,000 liters) equals 1.308 cubic yards.

### *Metric liquid measures.*

Milliliter ($\frac{1}{1000}$ liter) equals 0.0388 fluid ounce.
Centiliter ($\frac{1}{100}$ liter) equals 0.338 fluid ounce.
Deciliter ($\frac{1}{10}$ liter) equals 0.845 gill.
Liter equals 1.0567 quarts.
Decaliter (10 liters) equals 2.6418 gallons.
Hectoliter (100 liters) equals 26.417 gallons.
Kiloliter (1,000 liters) equals 264.18 gallons.

### *Metric measures of length.*

Millimeter ($\frac{1}{1000}$ meter) equals 0.0394 inch.
Centimeter ($\frac{1}{100}$ meter) equals 0.3937 inch.
Decimeter ($\frac{1}{10}$ meter) equals 3.937 inches.

Meter equals 39.37 inches.
Decameter (10 meters) equals 393.7 inches.
Hectometer (100 meters) equals 328 feet 1 inch.
Kilometer (1,000 meters) equals 0.62137 mile (3,280 feet 10 inches).
Myriameter (10,000 meters) equals 6.2137 miles.

*Metric surface measures.*

Centare (1 square meter) equals 1,550 square inches.
Are (100 square meters) equals 119.6 square yards.
Hectare (10,000 square meters) equals 2.471 acres.

# MINERAL-SPRING-WATER INDUSTRY.

## DEPARTMENT INSTRUCTION.

DEPARTMENT OF STATE,
*Washington, February 2, 1900.*

*To the Consular Officers of the United States.*

GENTLEMEN: The editor of the American Wine Press and Mineral Water News, New York City, has addressed the following communication to the Department:

> On account of the growth and progress of the mineral-spring-water trade in the United States, it would be of interest and value to know how the trade is conducted abroad, especially in France and Germany, in which it is an important social and commercial feature. I would therefore request the Department of State to instruct its consular officers in the several countries to investigate and report on the following points:
>
> (1) An account of the springs and spas in their respective districts, their management, the efficacy of the waters, etc.
>
> (2) The sale of the waters in bottles, their exports, especially their exports to the United States; whether the waters undergo any manipulation for export, etc.
>
> (3) Any other information which would be of practical interest, not alone to the trade in the United States, but to consumers in general.

You are therefore requested to institute the necessary inquiries in regard to the mineral springs in your district and the trade in their waters, especially with regard to the export trade, and report results at your earliest convenience.

As valuable springs may exist whose good qualities are unknown outside of local areas, this instruction has been transmitted to consuls generally with the view of covering the subject as fully as possible.

The replies hereto will be printed in CONSULAR REPORTS.

I am, etc.,

THOS. W. CRIDLER,
*Third Assistant Secretary.*

## AUSTRIA.

The mineral-spring-water industry in Austria has been highly developed. The numerous springs of the country represent medicinal waters of the most varied chemical combinations and adapted to the alleviation and cure of many diseases. The proceeds of the very considerable sale and exportation of the waters, however, represent only a part of the profit that the country derives from these springs. Situated in beautiful mountainous regions, they have become the nucleus of flourishing health resorts, to which thousands of visitors come annually. It is customary to collect from visitors staying for a longer period than five days a cure tax, graded according to rank and means of the visitors into first, second, and third class and varying from 4 to 20 crowns (80 cents to $4). The revenue thus derived is applied to beautifying the spa and furnishing several concerts daily. Each of these resorts has its "Kurhaus," with reading and music room, and a hall where a band plays in bad weather. Hotels are not so much in favor as apartments without board, and meals are taken at restaurants, which are both excellent and numerous and where food in conformity with the diet prescribed to patients can always be had.

### STYRIAN SPRINGS.

The province of Styria contains three spas of great importance—Rohitsch-Sauerbrunn, Radein, and Gleichenberg. The two celebrated springs of Rohitsch-Sauerbrunn—the Temple and Styria springs—are employed exclusively for drinking. The waters are saline-alkaline-acidulous, form a refreshing drink, and those of the Temple Spring have been exported in large quantities to all parts of the world for two centuries. Export of the Styria Spring waters was begun only in 1884. They are specially favorable for diseases of the digestive organs. More than 1,000,000 quarts of these waters are annually exported. Up to 1889, the bottling was effected by means of pumping engines; but as by this method a part of the carbonic acid escaped, a new central filling plant was projected, a feeding shaft through which the waters should be conducted in enameled pipes at a moderate decline from the bottom of the spring inclosures. This has proved entirely successful, the escape of carbonic acid being avoided (which can not be done by a pumping apparatus, however excellently contrived), enabling, besides, a more rapid and ample use of the springs.

The waters are taken cold for obesity, scrofulous affections, gout, anæmia, Bright's disease, chronic catarrhs of the stomach or throat, enlargement of the stomach, and habitual constipation; warm, for severe cases of stomach catarrh and ulcers, chronic catarrh of the bowels, obstinate cases of jaundice, gallstones, granulated liver, diabetes, catarrh of the bladder, and chronic catarrh of the larynx and bronchia.

The waters, according to the latest analysis, contain, in 10,000 parts:

| Constituents. | Temple Spring. | Styria Spring. |
|---|---|---|
| Sulphate of potash | 0.3616 | 2.1292 |
| Sulphate of soda | 19.6068 | 19.2772 |
| Nitrate of soda | 0.1187 | 0.0092 |
| Chloride of soda | 1.695 | 0.9425 |
| Iodide of soda | 0.0013 | 0.0003 |
| Acidulous carbonate of soda | 10.835 | 14.2281 |
| Acidulous corbonate of magnesia | 34.35 | 45.3331 |
| Acidulous carbonate of manganese | ..... | 0.0386 |
| Acidulous carbonate of iron | 0.068 | 0.0623 |
| Phosphate of alumina | 0.0095 | 0.01 |
| Silicic acid | 0.3307 | 0.41 |
| Perfectly free carbonic acid | 24.4907 | 31.4969 |
| Sum of weighable elements | 102.2335 | 122.3218 |

There are traces of barium, strontia, lithia, boron, bromon.

The temperature is 10.6° Celsius.

The price of the waters, per 100 quart bottles, loose, is $7.30; packed, $8.22.

The special attribute of the Radein springs is the considerable quantity of bound carbonic acid which they contain. The chemical analysis of the waters shows, in every 10,000 parts:

| | |
|---|---|
| Sulphate of potash | 1.779 |
| Sulphate of soda | 1.841 |
| Chloride of soda | 6.079 |
| Bromide of soda | 0.25 |
| Iodide of soda | 0.384 |
| Carbonate of soda | 30.107 |
| Carbonate of lithia | 0.412 |
| Carbonate of magnesia | 2.962 |
| Carbonate of calcareous earth | 4.513 |
| Carbonate of ferrous oxide | 0.087 |
| Phosphate of alumina | 0.035 |
| Silicic acid | 0.19 |
| Sum of fixed elements | 48.639 |

The temperature is 11.8° Celsius.

The waters of the Radein springs exercise a healing effect in cases of bladder and kidney diseases and act favorably on catarrh of

the respiratory organs. The waters are much used as a table drink and admixture for wines. They are sold in glass bottles at $9.75 per 100 loose and $10.86 packed.

Gleichenberg contains four celebrated springs—the Constantin, Emma, Johannis, and Klausen-steel springs. It is a spa much resorted to by sufferers from throat and lung diseases. For local treatment of catarrh, inhalation of an atomized product of the Constantin Spring—"spring brine"—is employed. By evaporation of the spring water in large pans, steam being the motive power, the earth carbonates are expelled and the remaining solution of alkalis reduced to one-half. When the aërometer shows a specific gravity of 1.01, the concentration process is stopped and the 1 per cent solution filled into cylindrical containers. Through these, by an automatic manipulation, the carbonic-acid gas of the spring is conducted at night, in order to effect the restoration of the carbonates to bicarbonates—a necessary process, for the reason that the carbonates generated by the heating of the alkalis might produce irritation of the mucous membrane of the bronchia. This must be avoided to make the spring brine a remedy which can be freely used.

The analysis of the waters shows, in 10,000 parts:

| Constituents. | Constantin. | Emma. | Klausen. | Johannis. |
|---|---|---|---|---|
| Sulphate of potash | 1.023 | 0.732 | 0.0695 | 0.0114 |
| Sulphate of soda | ..... | 0.371 | 0.1263 | ..... |
| Chloride of potash | 0.012 | ..... | ..... | ..... |
| Chloride of soda | 18.223 | 14.28 | 0.0025 | 5.0874 |
| Bromide of soda | ..... | 0.044 | ..... | ..... |
| Iodide of soda | ..... | 0.002 | ..... | ..... |
| Borate of soda | 0.082 | 0.035 | ..... | ..... |
| Phosphate of soda | 0.006 | 0.004 | 0.0125 | ..... |
| Carbonate of soda | 25.06 | 20.53 | 0.0145 | 19.501 |
| Carbonate of potash | ..... | ..... | ..... | 0.7306 |
| Carbonate of lithia | 0.039 | 0.007 | ..... | 0.0211 |
| Carbonate of calcium | 3.541 | 3.38 | 0.2357 | 5.1891 |
| Carbonate of strontia | 0.054 | 0.037 | ..... | ..... |
| Carbonate of barium | 0.004 | ..... | ..... | 0.0134 |
| Carbonate of magnesia | 4.215 | 3.448 | 0.059 | 4.6009 |
| Carbonate of iron | 0.027 | 0.058 | 0.1037 | 0.1441 |
| Carbonate of manganese | 0.002 | 0.001 | ..... | ..... |
| Aluminum oxide | 0.002 | 0.0006 | 0.0098 | 0.0233 |
| Silicic anhydride | 0.647 | 0.613 | 0.7127 | 0.2243 |
| Organic carbon | ..... | 0.05 | ..... | ..... |
| Cæsium and rubidium | Traces. | Traces. | ..... | ..... |
| Nitrate of potash | ..... | ..... | ..... | 0.079 |
| Sum of fixed elements | 52.397 | 43.5426 | 1.3462 | 35.639 |
| Carbonic acid: | | | | |
| Half bound | 14.212 | 11.846 | 19.4076 | 13.0907 |
| Free | 20.519 | 19.035 | ..... | 23.2363 |
| Specific gravity | 1.0057 | 1.00485 | ..... | ..... |

The temperatures are: Constantin, 17.3° C.; Emma, 14.5° C.; Klausen, 7.8° Réamur; Johannis, 9.2° Réamur.

The Klausen steel waters are successfully employed as a remedy for defective blood, and as a tonic for convalescents. The waters are sold as follows, per 100 bottles:

| Waters. | Loose. | Packed. |
|---|---|---|
| Constantin, 1⅛-quart bottles | $9.75 | $10.86 |
| Emma, 0¾-quart bottles | 8.12 | 8.72 |
| Johannis, 1-quart bottles | 7.72 | 8.42 |
| Klausen, 0¾-quart bottles | 8.12 | 8.73 |

## TYROL SPRINGS.

The springs of Levico are in the province of Tyrol and have been known for more than two hundred years. The waters, owing to a combination of arsenious acid with sulphate-of-iron salt, possess a special virtue as a remedy in cases of anæmia, scrofula, nervous disorders, and skin diseases. Most medicinal springs contain iron, not as a sulphate, but as a carbonate of ferrous oxide only. The Levico waters are crystalline, colorless and pure, and of proven efficacy in all diseases of defective blood composition, nervous affections, and skin troubles. There are two springs, one a weak-water and the other a strong-water spring. Their analyses are, in 10,000 parts of water:

| Constituents. | Weak spring. | Strong spring. |
|---|---|---|
| Arsenic acid | 0.0095 | 0.086879 |
| Chloride of soda | 0.0003 | 0.001781 |
| Sulphate of protoxide of iron | 6.6278 | 25.675198 |
| Sulphate of iron oxide | 2.7272 | 13.01972 |
| Sulphate of alumina | 1.5919 | 6.239873 |
| Sulphate of copper | 0.052 | 0.474459 |
| Carbonate of protoxide of iron | 0.1558 | ..... |
| Sulphate of manganese | 0.0003 | 0.002418 |
| Sulphate of calcium | 3.2477 | 3.724983 |
| Sulphate of magnesia | 2.3648 | 3.833451 |
| Sulphate of potash | 0.0099 | 0.037031 |
| Sulphate of soda | 0.1579 | 0.312031 |
| Sulphate of ammonia | 0.0062 | 0.03227 |
| Silicic acid | 0.2293 | 9.310384 |
| Carbon in organic substances | ..... | 0.097825 |

They are taken one-half to one hour after meals, 2 to 4 tablespoonfuls of the weak waters to begin with, mixed with wine, beer, or plain water, which dose in the course of a fortnight or twenty

days may be increased to from 4 to 8 tablespoonfuls of the strong waters daily. The waters are also applied as compresses, washes, local douches, and atomized, in which forms they are effective for light disorders of the skin and the accessible mucous membranes. Used as a gargle, they are mixed with plain water in equal parts. Their price per 100 half-pint bottles, loose, is $13.80; packed, $14.30. The exportation figure has now reached 1,000,000 bottles annually.

The Roncegno Springs, also in the Tyrol, are noted for their arsenic properties, and the waters are efficacious in diseases of the blood, nerves, abdominal organs, and skin. They are so strong that the doses at the start are only a teaspoonful to children and a tablespoonful to adults, diluted with water and taken after each meal, the quantity increasing according to the disease to 5 tablespoonfuls at most. Toward the close of the treatment, the doses are gradually diminished in like manner. The Roncegno waters are also applied externally, mixed with one-third part distilled water, and used as a gargle or lotion; further, as a partial bath in cases of skin troubles. The analysis of the waters shows, in 1,000 parts:

| | Grams. |
|---|---|
| Chloride of soda | 0.00362 |
| Arsenate of soda | 0.1096 |
| Sulphate of soda | 0.0726 |
| Sulphate of potash | 0.0544 |
| Sulphate of magnesia | 0.4707 |
| Sulphate of lime | 1.8457 |
| Sulphate of cobaltous oxide | 0.02504 |
| Sulphate of nickel oxide | 0.04745 |
| Sulphate of manganese oxide | 0.21794 |
| Sulphate of alumina | 1.38978 |
| Sulphate of copper oxide | 0.02891 |
| Sulphate of iron protoxide | 0.0855 |
| Sulphate of iron oxide | 3.0375 |
| Phosphate of iron oxide | 0.03892 |
| Silicic acid | 0.1255 |
| Arsenite anhydride | 0.11585 |
| Organic substance | 0.2095 |
| Total | 7.87854 |

The price per 100 half-pint bottles, loose, is $13; packed, $13.50.

### UPPER AUSTRIAN SPRINGS.

Upper Austria possesses two spas of great celebrity—Gastein and Hall. The Gastein thermal water takes its origin from sixteen springs. The temperature of these springs varies from 22° to 39.5° Réamur and remains the same throughout the year, the waters all

showing the same chemical elements. A chemical analysis gives, in 10,000 grams of thermal water:

| | |
|---|---|
| Sulphate of potash | 0.067 |
| Sulphate of soda | 1.859 |
| Borate of soda | 0.059 |
| Phosphate of soda | 0.002 |
| Sodic chloride | 0.416 |
| Fluoride of sodium | 0.012 |
| Fluoride of lithium | 0.007 |
| Fluoride of potassium | 0.03 |
| Calcium bicarbonate | 0.084 |
| Strontium bicarbonate | 0.013 |
| Magnesium bicarbonate | 0.026 |
| Iron bicarbonate | 0.045 |
| Manganese bicarbonate | 0.006 |
| Cæsium, rubidium, aluminum, arsenic, titanic acid, volatile organic acids | Traces. |

The power of the thermal water for conducting electricity, in proportion to that of ordinary well water, is as 12 : 1.

The Gastein waters are helpful in diseases of the bladder and the kidneys, nervous dyspepsia, and chronic catarrh of the respiratory organs, especially the larynx. They are a distilled and naturally warm drink, and are rapidly diffused through the system. The price per 100 quart bottles, loose, is $8.94; packed, $9.84.

Hall is specially famous for the iodine products of its springs, which are successfully employed in the form of poultices and baths, as also in internal doses for ailments of the bones and joints, for scrofula, anæmia, and the absorption of old abscesses. The composition of the Hall waters is as follows, for every 10,000 parts of water:

| | |
|---|---|
| Chloride of lime | 0.397 |
| Chloride of soda | 121.7 |
| Chloride of magnesia | 2.426 |
| Chloride of calcium | 4.009 |
| Chloride of ammonia | 0.733 |
| Bromide of magnesia | 0.584 |
| Iodide of magnesia | 0.426 |
| Iron oxide | 0.044 |
| Alumina | 0.147 |
| Calcareous earth | 0.249 |
| Total | 130.715 |

The Hall waters are sold per 100 pint bottles, loose, at $10.96; packed, $11.47.

CARINTHIAN SPRINGS.

The province of Carinthia contains the two famous Preblau and "Römer" springs. The Preblau waters are known as the prototype of the purest of alkaline and carbonate-of-soda springs, and issue at a depth of 5 feet from the crystalline rock. The latest quantitative analysis shows, in every 10,000 parts of water:

| | |
|---|---|
| Sulphate of potash | 0.87 |
| Chloride of potash | 0.081 |
| Chloride of soda | 1.325 |
| Borate of soda | 0.324 |
| Carbonate of soda | 21.415 |
| Phosphate of calcium | 2.75 |
| Carbonate of calcium | 2.75 |
| Carbonate of strontia | 0.003 |
| Carbonate of magnesia | 0.683 |
| Carbonate of iron | 0.011 |
| Carbonate of manganese | 0.006 |
| Aluminum oxide | 0.002 |
| Silicic anhydride | 0.6 |
| Lithia, formic acid | Traces. |
| Organic substances | 0.046 |
| Carbonic acid: | |
| Half bound | 10.458 |
| Free | 21.734 |
| Sum of fixed elements | 28.114 |

The temperature is 7.8° Celsius.

The Preblau waters are largely used as a table drink. Their export has steadily increased, so that whereas in 1871 about 190,000 bottles comprised the amount of exportation, it now exceeds 500,000 bottles.

A case of Preblau waters containing 25 three-fourth-quart bottles sells at $1.73; 50 three-fourth-quart bottles, $3.25; 75 pint bottles, $3.45.

The Carinthian "Römer" (Roman) Spring derives its name from its situation on the old Roman highway which connected Celeja with Virunum, the capital of the ancient Noricum. It issues from conglomerate rock at a rate of 14 quarts per minute, increased to 47 quarts by a force pumping engine. It is a permanently flowing spring, independent of all changes of the weather. The waters are clear, odorless, and of pleasant acidulous taste. The temperature is 10° Celsius; the specific gravity, 1.003021. The analysis shows it to be a pure alkaline acidulous spring, containing a large amount of free carbonic acid. Sulphate salts are altogether absent; hence, there is no disagreeable odor after a longer period of preservation. The proportions of iron and organic substances it contains are remarkably small. The waters are efficacious for all affections of the

mucous membrane, catarrh, cough, hoarseness, whooping cough, throat troubles, digestive disturbances, and diseases of the bladder. They are reported to have an excellent tonic effect on debilitated, anæmic patients, and are given even to infants with an admixture of warm milk. The price at the spring for 50 pint bottles is $10.44.

The Darkau iodide-bromine spring is situated in the province of Silesia. Of all known iodine waters, these contain the largest amount of fixed bromine elements. A chemical analysis in 1 quart of this mineral water shows—

| | Grams. |
|---|---|
| Chloride of soda | 21.968 |
| Chloride of potash | 0.2062 |
| Chloride of calcium | 2.1384 |
| Sulphate of lime | |
| Chloride of magnesia | 0.774 |
| Bromide of magnesia | 0.1016 |
| Iodide of magnesia | 0.0319 |
| Carbonate of magnesia | 0.1832 |
| Carbonate of iron oxide | 0.0505 |
| Silicic acid | 0.0554 |
| Organic substances | 0.0432 |
| Sum of fixed elements | 25.5524 |

The iodide salts gained from this spring are used as admixture to baths, washes for local application, and for wet compresses. Rickets, scrofula; chronic joint, bone, and skin affections; gout, rheumatism, and kindred diseases are said to be curable through use of this spring.

The price of 100 five-eighth-quart bottles, loose, is $9.34; packed, $9.95.

### BOSNIAN SPRINGS.

The Guber springs of Srebenica, in Bosnia, are noted particularly for the large amount of sulphate of protoxide of iron and arsenic oxide (respectively, 3.734 and 0.061 in 10,000 parts of water) which the waters contain. They are most beneficial in diseases consequent on an abnormal composition of the blood, in skin and nervous disorders. The price per 100 half-pint bottles, loose, is $11.36; packed, $11.88.

### GALICIAN SPRINGS.

The Sczcawnica Springs, of Galicia, are alkaline-muriatic-acidulous, containing a large amount of iodine and bromine, and are beneficial in diseases of the respiratory organs, digestive apparatus, and abdominal troubles. The waters are sold per 100 five-eighth-quart bottles, loose, at $13; packed, $13.60.

## MORAVIAN SPRINGS.

The province of Moravia contains two mineral springs of importance—those of Luhatowitz and Saratica. The former are alkaline-muriatic, and in the amount of carbonate, iodide, bromide, and chloride of soda, as well as of iron, which they contain, are to be reckoned among the most powerful and dissolvent of medicinal waters. They are particularly efficacious in lingering cases of catarrh, gouty affections, gravel, and stone. The price per 100 five-eighth-quart bottles, loose, is $5; packed, $6.20.

The Saratica bitter waters for exportation are a mixture from four springs having the following fixed constituents, spring No. 1 containing in every quart fixed elements to the amount of 58.636 grams; springs Nos. 2, 3, and 4, 37.408 grams. Their analysis is as follows:

| Constituents. | Spring No. 1. | Springs Nos. 2, 3, and 4 (mixed). |
|---|---|---|
| Sulphate of soda | 29.399 | 11.361 |
| Sulphate of magnesia | 28.002 | 24.914 |
| Sulphate of lime | 0.896 | 0.841 |
| Chloride of soda | 0.144 | 0.144 |
| Carbonate of magnesia | 0.117 | 0.127 |
| Sulphate of strontia | 0.026 | Traces. |
| Sulphate of lithia | 0.024 | Traces. |
| Silicic acid | 0.01 | 0.01 |
| Organic substances | 0.018 | 0.011 |
| Free carbonic acid | Traces. | Traces. |

The commingled waters are forced by means of pumping engines into a large reservoir, whence they are filled into bottles, and their average composition now shows—

| | |
|---|---|
| Fixed elements | 42.27 |
| Sulphate of soda | 17.82 |
| Sulphate of magnesia | 28.37 |
| Sulphate of lime | 0.81 |
| Chloride of soda | 0.14 |
| Carbonate of magnesia | 0.12 |
| Silicic acid | 0.01 |

There are also small quantities of sulphate of lithia and strontia, traces of organic substances and free carbonic acid. They are a mild but highly effective aperient, containing some 47 grams of purgative salts in a quart of water, and are taken for catarrh of the stomach and bowels, congestions, gout, obesity, and for various woman's diseases. The price per 100 five-eighth-quart bottles, loose, is $8.12; packed, $8.72.

There are, besides, in the district covered by the springs above enumerated, a number of mineral springs of local importance only, which have but trifling, if any, export.

## IMPORTS AND EXPORTS OF MINERAL WATERS.

The following tables give the exports and imports of mineral waters for all Austria-Hungary during the five years from 1894 to 1898, both inclusive:

*Imports.*

| Whence imported. | Quantity. | Value. |
|---|---|---|
| 1898: | *Tons.* | |
| Belgium | 0.3 | $18.80 |
| British India | 0.8 | 49.60 |
| Egypt | 0.1 | 6.40 |
| France | 89.2 | 5,530.40 |
| Germany | 2,741.4 | 169,966.80 |
| Great Britain | 1.3 | 80.40 |
| Italy | 53.4 | 3,310.30 |
| Roumania | 2.5 | 155.20 |
| Russia | 0.3 | 18.80 |
| Servia | 1.1 | 68.00 |
| Switzerland | 16.9 | 1,047.60 |
| Total | 2,907.3 | 180,252.80 |
| 1897 | 3,177.2 | 193,809.20 |
| 1896 | 2,970 | 178,617.20 |
| 1895 | 3,326.2 | 219,531.20 |
| 1894 | 3,079.5 | 203,248.40 |

The duty is 23.5 cents per 220 pounds. The average weight of a case containing 100 quart bottles is one-fourth of a ton (550 pounds).

*Exports.*

| Whither exported. | Quantity. | Value. |
|---|---|---|
| 1898: | *Tons.* | |
| United States | 1,230.9 | $78,777.60 |
| Africa | 48.8 | 3,123.20 |
| America (not otherwise specified) | 60.5 | 3,872.00 |
| Argentine Republic | 93.9 | 6,009.60 |
| Asia | 1.4 | 89.60 |
| Australia | 1.2 | 76.80 |
| Belgium | 386.3 | 24,723.20 |
| Brazil | 379.9 | 24,313.60 |
| British Australia | 20.7 | 1,324.80 |
| British India | 101.3 | 6,483.20 |
| British possessions in the Mediterranean | 30.9 | 1,977.60 |
| British West India | 272.5 | 17,440.00 |
| Bulgaria | 138.5 | 8,864.00 |
| Cape Colony | 234.1 | 14,982.40 |
| Chile | 3.2 | 204.80 |
| China | 33.2 | 2,124.80 |
| Cuba | 3.7 | 236.80 |

*Exports*—Continued.

| Whence imported. | Quantity. | Value. |
|---|---|---|
| 1898—Continued. | *Tons.* | |
| Denmark | 4.2 | $268.80 |
| Dutch India | 10.2 | 652.80 |
| Egypt | 239.5 | 15,328.00 |
| France | 2,354.7 | 150,700.80 |
| German Empire | 7,823.1 | 500,678.40 |
| German protectorate in Africa | 0.3 | 19.20 |
| Great Britain | 1,824.6 | 116,774.40 |
| Greece | 118 | 7,552.00 |
| Hamburg (free zone) | 1,585 | 101,440.00 |
| Italy | 2,263.9 | 144,889.60 |
| Japan | 6.1 | 390.40 |
| Mexico | 0.6 | 38.40 |
| Montenegro | 1.3 | 83.20 |
| Netherlands | 55.5 | 3,552.00 |
| Norway | 0.4 | 25.60 |
| Peru | 28.3 | 1,811.20 |
| Portugal | 25.7 | 1,644.80 |
| Roumania | 2,562.1 | 163,974.40 |
| Russia | 1,683.9 | 107,769.60 |
| Servia | 94.7 | 6,060.80 |
| Spain | 4.7 | 300.80 |
| Sweden | 2.5 | 160.00 |
| Switzerland | 678.1 | 43,398.40 |
| Trieste (free zone) | 203.6 | 13,030.40 |
| Tunis | 9.4 | 601.60 |
| Turkey | 380.2 | 24,332.80 |
| Total | 25,001.6 | 1,600,102.40 |
| 1897 | 24,369.2 | 1,657,105.60 |
| 1896 | 23,627.1 | 1,559,388.80 |
| 1895 | 21,168.4 | 1,397,117.60 |
| 1894 | 19,269.7 | 1,271,804.00 |

CARL BAILEY HURST,
*Consul-General.*

VIENNA, *May 19, 1900.*

## BOHEMIA.

It is probable that no other territory of equal extent in the world contains so many mineral springs and of so diversified a character in the healing uses to which their waters are applied as the northern half of Bohemia—about equal in area to the State of New Hampshire. Within this territory are Carlsbad, Marienbad, Bilin, Johannisbad, Franzensbad, and a multitude of other places less widely known, where mineral springs yield waters which cure disease by internal or external use. Most of these springs are within the Prague consular district. Near this city are several resorts, local in reputation, but situated among delightful surroundings—mountain and valley, with charming walks and drives meandering over and through them. Bad Schlag is small, but its baths are found to be health giving. Liebwerda is more populous during the season, and many people in

impaired health find relief from its chalybeate springs. From neither of these places is water exported at present.

Johannisbad, in the Riesengebirge (Giant Mountains), in the eastern part of this district and its principal watering place, has a large number of springs. The temperature of the water is always 82° F. It is chiefly used for baths, and with the healthful climate is remedial in all nervous disorders. The water is also drunk after cooling, being considered good for gout and various stomach troubles. It is not bottled or exported, except as it may be taken away by patients from a distance—many coming here from Berlin and other German cities.

### RUDOLFSQUELLE.

The only mineral spring in this district whose waters are at present bottled and exported is Rudolfsquelle (Rudolf's Spring), in the town of Maffersdorf, a suburb of this city. It was discovered in 1863; but no use was made of it in a business way till 1890, when a building was erected. It is managed by a stock company. There is, however, a lack of push and enterprise in the administration which prevent the water from having the extensive sale that its merits warrant.

The spring yields 4,000 gallons a day. Most of this runs away unused. Half a million bottles were sold last year, and the sales show annually a slight increase. The bottles are mainly of pint and quart size.

The water is recommended for gout, rheumatism, and throat, kidney, and stomach troubles. The water effervesces, and is pleasant to the taste. It undergoes no manipulation of any sort for export. The chief shipments are to Germany. Nearly all European countries buy more or less of it, but none goes to America.

Analysis of the water shows, in 10,000 parts, the following elements:

| | |
|---|---|
| Natrium bicarbonate | 6.70249 |
| Kalium bicarbonate | 1.06442 |
| Iron bicarbonate | 0.29194 |
| Manganese bicarbonate | 0.03628 |
| Nickel bicarbonate | 0.01394 |
| Cobalt bicarbonate | 0.01132 |
| Calcium bicarbonate | 3.1553 |
| Magnesium bicarbonate | 1.352 |
| Natrium chloride | 0.20182 |
| Natrium sulphate | 0.16132 |
| Clay | 0.022 |
| Kiesel silicic acid | 0.8072 |
| Lithium | Traces. |
| Titans acid | Traces. |

There is also carbonic acid in the spring, which is eliminated as the water gushes out.

Baths are taken at this spring, but the place is not yet much frequented for that purpose.

Water from Rudolf's Spring received the highest premium at the expositions in Vienna, Venice, and Dresden in 1894, in Berlin in 1895, and in Prague in 1896—gold medals in each case.

Only the lack of enterprising management prevents this water from ranking in the world's estimation with Apollinaris.

FRANK W. MAHIN,

REICHENBERG, *March 10, 1900.* *Consul.*

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## BELGIUM.

### LIEGE.

Several centuries ago, the mineral springs of the Liege consular district became famous for their medicinal qualities. Victor Hugo spent much of his exile and wrote several of his great works here, and it was here that Napoleon I was wont to recuperate his wasted energies.

At Spa, a city of about 4,000 inhabitants, situated nearly 10 miles to the east of the city of Liege, is a group of seven springs, no two of which produce water containing the same minerals.

These springs are controlled by the Compagnie Fermière des Eaux Minerale, avenue du Marteau, Spa, and are under the immediate supervision of the city authorities.

The grounds are laid out as a public park, with beautiful walks and drives from spring to spring, and all visitors are at liberty to drink the water from the following springs: Le Pouhon Pierre-le-Grand, Le Tonnelet, La Sauverinière, Le Groesbeck, La Géronstère, and Barisart. Water from the Marie-Henriette furnishes the bathing establishment, which is very extensive and well arranged, containing separate parlors for ladies and gentlemen, reading rooms, gymnasium, and sixty-four bathrooms.

The water from Le Pouhon Pierre-le-Grand is principally bottled for medicinal and table uses. The official analysis of the water from this spring is as follows:

| | |
|---|---|
| Density | 1.0014785 |
| Free carbolic acid | 25.5278 |
| Bicarbonate of sodium | 1.2222 |
| Bicarbonate of potassium | 0.1184 |
| Bicarbonate of calcium | 0.405 |
| Bicarbonate of magnesium | 0.1825 |
| Bicarbonate of iron | 1.1248 |

| | |
|---|---|
| Bicarbonate of manganese | 0.0386 |
| Chloride of sodium | 0.5402 |
| Sulphate of sodium | 0.2316 |
| Silica | 0.49 |
| Alumina | 0.143 |
| Sulphurated hydrogen | 0.0011039 |
| Dry residuum | 6.11 |

The temperature in summer is 51.44° F.

An official analysis of the waters of the different springs which are bottled for commercial use shows bicarbonate of iron as follows:

| | |
|---|---|
| Sauverinière | 0.08957 |
| Tonnelet | 0.06593 |
| Barisart | 0.06 |
| Géronstère | 0.05537 |

These waters are especially recommended for chlorosis and anæmia and in all skin diseases and stomach troubles. They are also beneficial in nervous disorders, rheumatism, and female troubles, and are used both for drinking and bathing.

The best results are secured by using the water fresh from the springs; but I am informed the product is so carefully bottled under the supervision of the city authorities that not more than 10 per cent of the bicarbonate-acid gas is lost, and the bicarbonate of iron is not disturbed by a long journey.

I am told none of the water exported from these springs is artificially treated in any manner. The waters are extensively used on this continent for medical and table uses, but so far none has been shipped to the United States.

The water is sold by the case on board the cars at Spa as follows: Case of 12 bottles, 7.50 francs ($1.45); case of 24 bottles, 13.50 francs ($2.60); and a case of 50 bottles, 26.50 francs ($5.12).

Spa is quite a noted resort, being visited by thousands during each summer, both for health and pleasure.

### CHAUDFONTAINE.

At Chaudfontaine (Hot Springs), about 2 miles southeast of this city, is a fountain after which the village of a few hundred inhabitants was named. The waters of this spring have a temperature of 97° F., and are well charged with minerals and electricity. They are of volcanic origin. Dr. Felix estimates they come from a depth of 2,500 meters, or 8,300 feet. It is noticeable that the temperature in 1818 was 88.5° F.; in 1857, 93.2°; and in 1867, 97°.

From the similarity in temperature and mineral qualities, the water is supposed to be of the same source as that of Néris-les Bains, Plombières, Luxeuil, and La Malou, France; Baden-Baden, Wildbad, Teplitz, and Schlangenbad, Germany; Baden, Budapest, and Mehadia, Austria-Hungary; and of Pfaefers and Ragaz, Switzer-

land. The water from Chaudfontaine is the warmest, and thus can be readily used without changing its temperature, which would materially alter its chemical composition.

A liter, or 1.76 pints, of this water, evaporated at a temperature of 212° F., leaves a residue of 0.3633 gram, while the analysis of the same quantity at its natural temperature shows the following:

| | Grams. |
|---|---|
| Free carbonic acid | 0.138 |
| Sulphate of soda | 0.0093 |
| Sulphate of calcium | 0.044 |
| Sulphate of potassium | 0.002 |
| Chloride of soda | 0.1073 |
| Carbonate of calcium | 0.1398 |
| Carbonate of manganese | 0.0296 |
| Carbonate of lithia | Traces. |
| Silica | 0.018 |
| Total | 0.488 |

If allowed to cool, an analysis shows the following:

| | Grams. |
|---|---|
| Free carbonic acid | 0.061 |
| Bicarbonate of calcium | 0.2013 |
| Bicarbonate of manganese | 0.0451 |
| Bicarbonate of lithia | Traces. |
| Chloride of soda | 0.1073 |
| Sulphate of calcium | 0.044 |
| Sulphate of soda | 0.0083 |
| Sulphate of potassium | 0.002 |
| Silicia | 0.018 |
| Total | 0.488 |

The spring is controlled by the Chaudfontaine Hotel, Casino, and Club Company, Limited, with offices at Chaudfontaine and 22 rue de Châteaudun, Paris. The grounds are handsomely arranged and the scenery is picturesque. A large hotel of one hundred and twenty rooms overlooks the park. The baths immediately adjoin the hotel and are noted for softening and whitening the skin. These waters are said to do wonders in cases of rheumatism, gout, gravel, kidney troubles, and skin diseases.

The waters are bottled without being modified in any way, and are shipped to all the countries of this continent, so I am informed; but as yet none have been sent to the United States.

ALFRED A. WINSLOW,

LIEGE, *March 31, 1900.* *Consul.*

## ANTWERP.

Consul-General Lincoln writes from Antwerp, March 5, 1900, that no mineral-water springs exist in that district.

## DENMARK.

So far as I can learn, there are no mineral waters bottled in this country for medicinal use. There are a few springs whose waters contain iron, and hotels accommodate guests who wish to take the waters. These places are more in the nature of pleasant summer resorts, one of the agreeable features of which is the bathing in the iron-impregnated water.

There is no foreign demand for these waters, and, as a matter of fact, their principal curative virtue lies in the fact that there is enjoined upon their users a modified diet and considerable abstinence in the matter of alcoholic beverages. One of the springs in this city is in the Kongens Have.

At Silkeborg, Jylland, there is a Vandkur Anstalt, where those taking the cure drink the waters and bathe in them under the direction of a physician. This water, which is taken by anæmic and neuresthenic people, contains a fair percentage of iron, and the rest, the charming surroundings, and the delightful air make this a rather popular resort; but people who need medicinal baths and drinking waters usually go to the spas of Germany and Bohemia.

J. C. INGERSOLL,

COPENHAGEN, *April 27, 1900.* *Consul.*

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## FRANCE.

### PARIS.

France is excessively rich in mineral waters, its springs representing all the degrees of thermal mineralization. The French Government considers it one of its important duties to watch over this national wealth, and regulates the exploitation down to the minutest detail.

In the year 1899, there were in France nine hundred and fifty springs, including those not commercially worked. These springs were located in three hundred and thirty-two different localities, geographically forming a long belt starting from the Pyrenees, following the River Rhone to the east, the mountains of the Department of Cantal and of Auvergne to the west, and ending directly in the Department of the Vosges.

Although there are no special characteristics for each region, certain predominating elements permit a natural classification.

Thus, the mountains in the south and west possess a collection

of sulphur-water springs, of which Cauterets and Challes are the most noted. In the rich basin of the center of France, with its varied geological compositions, are found in quite distinct groups the Vals, Vichy, the Loire, Bourboule, Mont Dore, and Châtelguyon, in the Department of the Vosges; two types characterized by silicatec sodique (at Plombières); of bicarbonate of arsenical iron (at Bussang); and the lithiated springs of Contrexéville, Vittel, and Martigny, whither come sufferers from gout and gravel from all parts of the globe to seek a remedy for their ailments.

There have been many classifications of the mineral waters of France, but the following is the most generally accepted:

*Sulphurous* (*soda*).—Amélie-les-Bains, Cauterets, Challes-Eaux Bonnes-Labapère, and Bagnères-de-Luchon.

*Sulphurous* (*lime*).—Aix-les-Bains, Allevard, Enghien.

*Saline* (*soda*).—Biarritz, Brides, Salies-de-Béarn.

*Saline and alkaline.*—La Bourboule, St. Nectaire.

*Saline and sulphurous.*—Uriage.

*Alkaline* (*sodaic*).—Vichy, Vals.

*Alkaline* (*lime*).—Alet, St. Galmier, Pougues.

*Alkaline.*—Contrexéville, Evian.

*Saline* (*sodaic*).—Plombières.

*Saline* (*lime*).—Aulus, Capvern, Contrexéville-Pavillon, Vittel.

*Chalybeate and alkaline.*—Bussang, Forges-les-Eaux, Orezza, Vic-sur-Cère.

GOVERNMENT SUPERVISION.

The French Government fully realizes the importance of enforcing every guaranty to insure these mineral waters a reputation beyond criticism. It instructs departmental officers to inform all owners of springs operated in their respective localities that they should see that the mineral waters, whether consumed on draft or bottled for transportation, should be above suspicion. It is likewise exacted that a list of all springs, with full details, shall be furnished from the respective jurisdictions to the Academy of Medicine.

Instructions are given as to formalities necessary to obtain authorization to develop a newly discovered source. The regulations are:

(1) Formal request to work a newly discovered spring must be addressed to the préfet of the Department in which the spring is located. Each spring should have a distinct name, outside of its geographical denomination. This request is accompanied by: First, analysis of the water; second, an agreement that if permission to work the spring is accorded, no component of the natural water will be extracted, nor will it be gasified.

(2) There shall be submitted by the préfet, in accordance with the royal decree of June 18, 1823, for special examination, viz: First, report of the mining engineer of the particular locality, with drawings indicating the exact situation, the output, the temperature, how discharged and preserved, with an attestation that it is in

its complete original state and not gasified; second, the opinion of the council of public health as to the therapeutic properties of the water in question.

(3) The préfet shall transmit the documents to the Minister of the Interior, with his opinion.

(4) If considered favorably by the minister, a request shall be made through the préfecture for a quantity of samples for official analysis at the Academy of Medicine.

(5) An opinion from the bacteriologist of the Government laboratory shall be obtained.

(Should the academy report be favorable and the minister have signed the authorization, an additional ordinance indicates the hygienic conditions to be complied with.)

*Isolation.*—The water must, from the moment it leaves its source until its arrival at the place where it is drawn off or bottled, be exposed in no way to contact with the air, and the basin of the spring must be covered.

*Bottling.*—A.—The first washing of the bottles shall be effected in a place distinct from and independent of the one where the bottling is done.

B.—The bottles shall then undergo the first sterilization by a prolonged immersion in water acidified by 100 grams of commercial sulphuric acid to 1 liter of water.

C.—The first purification completed, the bottles shall be taken head downwards to the bottling building.

D.—The bottling building should contain nothing but what is necessary for the final rinsing, immediately preceding the process of bottling. Accessories should be absolutely cleansed by water heated to 120° centigrade under pressure, or by subjecting them to a filtration which will guarantee complete cleanliness.

The principal springs, as Vichy and the Celestins, must use for this cleansing the system Rouart Geneste and Herscher. If the expense of the above-mentioned systems is too high, the Chamberland filter system may be used.

E.—No interval should occur between the final cleaning of the bottles and the filling, nor between the filling and the corking.

F.—The corks should be of the first quality, purified by soaking for forty-eight hours in water containing 200 grams of sulphite of soda to the liter, afterwards remaining in filtered or sterilized water until used.

Any manipulation whatever is positively forbidden. The ordinance of the administration to that effect is as follows:

Every petition for authority to conduct a mineral-water spring shall be accompanied by a certificate emanating from the bureau of mines to the effect that the water has in no manner been subjected to the extraction of any of its original elements or been gasified, and the owner or owners must undertake that no such manipulation shall occur.

Hermetically sealed reservoirs, receiving the water with its gases direct, forming, in fact, a portion of the direct basin, are permitted; but the water must not remain therein over twenty-four hours, thus assuring to the patient the curative properties of the mineral water.

Statistics show that in 1899 there were in France five hundred and eleven doctors treating exclusively by means of mineral waters.

The strict regulations of the trade in mineral waters in France

are not only of the utmost importance to the medical profession, but have produced a remarkable development in the industry and created a high reputation for the waters abroad. Exports amount, on an average, to 10,000,000 bottles a year, of which the United States, it is estimated, receives 1,200,000 bottles.

JOHN K. GOWDY,
*Consul-General.*

PARIS, *May 9, 1900.*

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## BORDEAUX.

In response to Department circular in reference to mineral waters in this consular district, I submit the accompanying list of known and patronized mineral springs.

The first column on the left gives the name of the Department in which the springs are located, the second gives the city or village nearest them, the third the temperature (Fahrenheit), the fourth the mineral qualities of each, and the fifth the method of use.

The waters of only four of these are ever bottled—those of Bonnes, Cauterets, Cazost, and Labassère. These are bottled and sold in various parts of France, but not in any great quantity. None of them are exported.

They are bottled direct from the spring without manipulation

*Mineral waters in the consular district of Bordeaux.*

| Department. | Town. | Temperature, Fahrenheit. | Mineral qualities. | Method of use. |
|---|---|---|---|---|
| | | *Degrees.* | | |
| Ariége | Audinac | 72 | Bitumen; 0.03 of hydrosulphuric and carbonic acid. | Bath. |
| | Ax | 113 to 200 | Sulphurate of sodium | Do. |
| | Ussat | 82 to 101 | Saline, sulphate of magnesia. | Do. |
| Garonne (Haute) | Encausse | 76 | Saline, gaseous | Beverage. |
| | Luchon | 62 to 164 | Sulphurate of sodium | Bath. |
| Gers | Barbotan | 88 to 101 | Ferruginous; bicarbonate. | Beverage. |
| | Castéra-Verduzan | 78 | Hydrosulphuric acid | Bath and beverage. |
| Landes | Gamarde | Cold. | do | Do. |
| | Dax | 86 to 184 | Saline | Bath. |
| Pyrénées (Basses) | Bonnes | 92 | Sulphurate of sodium | Beverage. |
| | Cambo | 74 | Hydrosulphuric acid | Bath and beverage. |
| | Eaux Chaudes | 95 | Sulphurate of sodium | Bath. |
| Pyrénées (Hautes) | Bagnères-Adour | 66 to 122 | Salts | Bath and beverage. |
| | Barèges | 108 | Sulphurate of sodium | Do. |
| | Cadiac | Cold. | Sulphurate of sodium, iodide and bromide of potassium, and glairin. | Bath. |

*Mineral waters in the consular district of Bordeaux*—Continued.

| Department. | Town. | Temperature, Fahrenheit. | Mineral qualities. | Method of use. |
|---|---|---|---|---|
| | | *Degrees.* | | |
| Pyrénées (Hautes)—Continued. | Cauterets | 119 | Sulphurate of sodium | Bath and beverage. |
| | Cazost | Cold. | Sulphurate of sodium and glairin. | Beverage. |
| | Labassère | Cold. | Sulphurate of sodium | Bath and beverage. |
| | St. Sauveur | 95 | ....do | Do. |
| | Vizos | Cold. | Sulphureted; bituminous. | Beverage. |

ALBION W. TOURGÉE,
*Consul.*

BORDEAUX, *April 13, 1900.*

## LYONS.

There are a number of springs in this district, but the only water exported to the United States or out of the district is Vichy. At Vichy, there are several mineral springs, all medicinal. The water undergoes no preparation whatever before being bottled. The only two Vichy spring waters exported are the Grand Grille and the Celestin, which are highly recommended, the first for liver complaints and the second for the bladder, rheumatic pains, and general stomach troubles. Vichy lozenges are also sold. The water is permitted to evaporate, and the salt that remains is compressed into lozenges, which preserve their virtue for years. They are dissolved in a glass of water or allowed to melt in the mouth.

It would be impossible to estimate the quantity of mineral waters drunk in France. It is enormous. Water can be bought for 5 cents a bottle, and 3 cents without the bottle. As a rule, the French people do not drink their wine pure, unless it is exceptionally mild or of a very superior brand, and then they drink sparingly in a very small glass. Many mix their wine with some kind of mineral water. In or in front of every grocery store are large quantities of mineral waters. A number of stores make a business of selling only mineral water, which is drunk pure or with wine.

I inclose a complete list of the mineral waters of France. The majority of them are recommended only for medicinal baths and are the center of watering places and summer resorts.*

JOHN C. COVERT,
*Consul.*

LYONS, *March 15, 1900.*

*A classified list of French mineral waters and their curative properties will be found with the ort from Marseilles.

## MARSEILLES.

The questions submitted by the Department concerning mineral waters in Europe, "with the view of covering the subject as fully as possible," could not be answered with any degree of accuracy in less than a volume. The use of such waters for curative purposes has continued in France from the time of the Roman occupation and has caused the development of an important industry. The waters have been studied, classified, and given a therapeutic value recognized by physicians and laymen. An extensive literature exists upon the subject, and the Government has extended a protecting hand to guard against deceit and charlatanism. The sale of natural mineral water in France is absolutely forbidden without Government authorization.

Before this authorization can be procured, application for the right of sale must be made to the Minister of the Interior. The minister causes official samples to be drawn and sealed, under conditions precluding the possibility of fraud, and these samples are analyzed by the chemists of the National Academy of Medicine. The analysis having been made, the Government next sends its engineers, who provide specifications for walls of masonry and concrete and drainage about the premises, so that the water drawn for public consumption may be guaranteed against pollution. These preparations having been made, the permit is finally issued and the sale begins.

Until the middle of the eighteenth century, thermal therapeutics were empiric. Bardeau opened a new era and was followed by other distinguished students, one party of whom devoted their time to chemical research and the other to the discovery of new uses to which the waters might be put. At present, the country is so dotted with springs and spas that I send a list of those in this consular district.

The use of the waters has become part of the life of the people, to an extent probably much underestimated by Americans. With watering places pretending to minister to all human afflictions, it is no uncommon matter for the French family to start off on a summer pilgrimage, treating this weakness here and that there, returning after the season presumably refreshed and reinvigorated. The apostles of the water cure assume to have found specifics or palliatives for all diseases except acute maladies, epilepsy, cancer, tuberculosis, organic affections of the heart and large vessels, the two first stages of syphilis, and diathesis.

Concerning the commercial side of the subject, there is little to

be said. The attractiveness of each "établissement" is advertised extensively, and depots for the sale of bottled waters exist in every city. The consumption is increased to some extent by the popular mistrust of municipal-water supplies. Physicians usually prescribe the water to be used by their patients, as well as the "établissements" to be visited in the summer season. Thus a demand has been created, and when profitable springs are discovered an effort is at once made to find a similar water near by. As such efforts frequently succeed, the number of springs annually increases.

The exports of mineral waters to the United States from Marseilles amounted in value to $4,806 during the year 1899. Roughly figuring, the total exportations from France amounted in value to $398,744 for the same period.

I append four supplements to this report, carefully compiled from official sources: "A" containing a complete list of the mineral waters of this consular district and Algeria, together with their characteristics; "B," a general classification of all the mineral waters of France, according to their predominant properties; "C," an alphabetical list of the principal affections and the waters and watering places in France suitable for their cure; "D," exportations of mineral waters from the port of Marseilles.

ROBERT P. SKINNER,
*Consul.*

MARSEILLES, *March 10, 1900.*

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SUPPLEMENT A.—LIST OF MINERAL WATERS "AUTHORIZED" IN THE CONSULAR DISTRICT OF MARSEILLES AND COLONY OF ALGERIA.

*Department of Aude.*

*Alet.*—Several springs, of which the best known is Communale, a bicarbonated calcic, much used for convalescents, and especially women after accouchment, vomiting of women enciente, anæmia, dyspepsia, chlorosis, sick headache, gastralgia, diarrhea, and dysentery. These waters are exported.

*Campagne.*—Warm waters, bicarbonated calcics, prescribed for gastralgia, dyspepsia, catarrh of the bladder, engrossment of the liver. This spring supplies an "établissement."

*Creuzy.*—Sulphated sodiac containing magnesia. A purgative water, used in cases of constipation, congestion of the liver, obesity.

*Escouloubre.*—A sulphureted sodiac, used in baths for affections of the skin and rheumatism and as a drink for chronic affections of the mucous membrane. Water contains sulphur of sodium.

*Ginoles.*—A spring utilized by an établissement, in which the water is employed as a diuretic in cases of gravel and as a laxative in maximum doses.

*Rennes.*—Five springs, utilized by an établissement. Three are hot and two cold sources. These waters are difficult to classify, being at once bicarbonates, sulphates, and chlorides. They are tonics and fortifiers.

*Department of Pyrénées-Orientales.*

*Amélie-les-Bains.*—Sulphureted sodiacs. The springs supply two thermal établissements, open all the year. The waters are specifics in certain maladies of the breast.

*Le Boulou.*—Five springs supplying one établissement. The waters are ferruginous, bicarbonated sodiacs, and closely resemble the waters of Vals and Vichy.

*Canaveilles.*—Several springs of sulphureted sodiacs.

*Les Escalas.*—Springs of warm and cold water, sulphureted sodiacs. Prescribed for affections of the respiratory organs, and dermatitis.

*Molitg.*—Several springs of sulphureted sodiacs, which supply two établissements, used externally and internally.

*Olette.*—Very abundant warm springs; water sulphureted sodiacs.

*La Preste.*—Sulphureted sodiacs, used in pulmonary affections, rheumatisms, dermatitis, and catarrhal affections.

*Le Vernet.*—Several établissements, which utilize the thermal sources of the neighborhood.

*Department of Vauclause.*

*Beaumes-de-Venise.*—Several springs, which supply an établissement. The spring known as "Sedlitz français Number One" is best known.

*Gigondas.*—A water strong in sulphur and tepid at the source.

*Montmirail-Vacqueyras.*—Three springs, supplying one établissement. The waters are strong in magnesia and iron and are exported in quantities. They are used internally; a dose of three or four glasses answers as a purgative.

*Urban-Vacqueyras.*—Two sulphurous and ferruginous springs supply an établissement.

*Velleron.*—A spring which throws a jet like an artesian well; strong in bicarbonates.

*Island of Corsica.*

*Caldane.*—Strong in iron and very gaseous.

*Caldaniccia.*—Five springs; strong in sulphur; used externally for rheumatism and affections of the respiratory organs; also used as drinks.

*Guagno.*—Two springs supply an établissement. The waters are strong in sulphur and are used for affections of the skin and wounds by firearms.

*Guitura.*—Does not stand transportation, the water containing sulphur and alkali; hot at the source.

*Oliveto.*—Mildly sulphurous; chlorureted sodiac.

*Orezza.*—Several springs; acid and ferruginous; much employed for convalescents.

*Pardina.*—Acid, ferruginous water; exported in bottles.

*Piedicroce.*—Gaseous and ferruginous.

*Pietripola.*—Nine springs supply an établissement; sulphurated sodiacs; warm at the source.

*Porta.*—An alkaline, ferruginous water; used exclusively as a drink.

*Pluzzichello.*—Two springs supply an établissement; sulphureted calcics; used externally and internally. The water is heavy and milky in appearance.

*Stazzona.*—Ferruginous gaseous water; exported.

*Colony of Algeria.*

*Hamman-Mescoutine.*—Hot springs near Constantine, supplying two établissements. The water is sulphurous; used for rheumatism.

*Hamman-Setif.*—This water owes its properties to its thermality; is considered a tonic, and used to build up convalescents.

*Department des Bouches-du-Rhône.*

*Aix.*—Two springs supply the établissement; thermal; both calcic bicarbonates; specifics for rheumatism and nervousness.

*Camoins.*—Sulphureted calcic.

*Roucas Blanc.*—Chloriated bromo-iodurated sodiac.

*Department des Hautes-Alpes.*

*Chauffaud.*—Two springs of bicarbonated calcic, carbonic ferruginous.

*Phazy.*—Two springs of chloriated sodiac and sulphated calcic.

*St. Pierre d'Argençon.*—A gaseous, ferruginous water, susceptible to exportation.

*St. Martin de Renacos.*—Several springs of sulphated, chloriated calcics, differing in proportions.

*Monastery of Briançon.*—Two hot spings, bicarbonates and sulphates; employed externally and internally for the digestive organs, bladder, and chronic rheumatism.

*Department of Ardèche.*

*Aizac.*—A ferruginous, bicarbonated sodiac; bottled and exported.

*Asperjoc.*—A ferruginous alkaline water, slightly acid; exported in bottles.

*St. Andeol de Bourlenc.*—A gaseous alkaline water, containing free carbonic acid; exported in bottles, and popular for table use.

*Barthalay.*—Bicarbonated calcic; bottled and exported.

*La Bégude.*—Ferruginous, gaseous, bicarbonated sodiac.

*Bois Lantal.*—Several springs of gaseous alkaline waters.

*La Boucharade.*—Three springs of alkaline waters; exported in bottles.

*Celles-les-Bains.*—Several springs of ferruginous, sulphated water; used internally and for baths and douches. Barrier considered them sovereign waters for the cancer, but this assertion has not been justified by experience.

*Chirols.*—Waters charged with carbonic acid so heavily that the sound of escaping gas can be heard at a distance; ferruginous bicarbonated calcic.

*Les Clots.*—Bicarbonated calcics strongly tinctured with iron; exported in bottles.

*Le Coulet.*—Bicarbonated sodiac.

*Dessaignes.*—A gaseous, bicarbonated sodiac; agreeable to the taste, and exported.

*St. Fortunat.*—Bicarbonated, ferruginous sodiac.

*Genestelle.*—A water known from time immemorial; gaseous, carbonated calcic.

*Jaujac.*—A limpid, gaseous alkaline carbonated water, tinctured with iron.

*St. Julien du Gua.*—Known for a century; bicarbonated, calcareous, ferruginous water.

*Juvinas.*—A gaseous alkaline water.

*St. Laurent-les-Bains.*—Thermal waters, sodiacs and carbonated; used in baths for rheumatism.

*St. Marcelle-de-Crussol.*—Very sulphurous; strong in iron.

*Marcols.*—An alkaline water, lightly touched with iron; exported.

*Meyras.*—Alkaline, gaseous, tinctured with iron.

*Le Pradel.*—Strong in iron, and exported.

*St. Melany.*—Sulphurous and alkaline; very different from most Ardèche waters; exported.

*Mont Pezet.*—Acid and slightly tinctured with iron; exported.

*Meyrac.*—Eight springs; strong in carbonic acid, bicarbonated sodiac, and calcareous; weak in iron; exported.

*Sausses.*—Gaseous and alkaline.

*St. Sauveur-de-Montagut.*—Long known and utilized as a table water; alkaline and gaseous.

*Le Seguin.*—Alkaline lithian water; weak in iron.

*Vernet.*—Very acid, gaseous, and depositing iron within the bottles; is largely exported, and used in the treatment of dyspepsia.

*Vals.*—These waters, derived from many springs, are in general limpid, without odor, with a strong alkaline taste, which they owe to bicarbonate of soda; and very piquant, because of the presence of carbonic acid in considerable proportions. They owe their therapeutic properties to the carbonate of soda. Another group of Vals waters comprises waters which, limpid when drawn, become troubled by contact with the air, which causes the iron to enter a state of advanced oxidization. The iron then forms a yellow sediment. These waters have no odor, but their taste is sweet, and they leave an aftertaste peculiar to ferruginous waters; they hold iron in solution by their carbonic acid. The Vals waters are used for baths and douches, but more particularly for consumption. They are exported on a large scale, and retain their properties well. The water from eighty-two springs was being exported in 1893, and the number is probably considerably greater at present.

*Department of Drôme.*

*Alan.*—Supplies a thermal establishment; is acid, lightly sulphurous and bromo-iodurated; is exported.

*La Bretonnière.*—Ferruginous water, which becomes yellow after being drawn; is slightly gaseous.

*Condillac.*—Two springs, gaseous acid, lightly iodurated; is exported.

*Condorocet.*—Sulphated calcic.

*Dieulefit.*—Bicarbonated calcic, lightly ferruginous.

*Miral.*—Chlorureted sodiac, iodo-bromurated.

*Montbrun.*—These several springs deposit a mud; employed externally for affections of the joints and chronic ulcers.

*Propriac.*—A sulphated calcic.

*Vaugnières.*—Bicarbonated acid, ferruginous calcic; exported.

*Department of Basses-Alpes.*

*Digne.*—Four springs of chlorureted bicarbonated ferruginous waters, employed externally in cases of scrofula. These waters have been used and the baths frequented since the twelfth century.

*Gréoux.*—Warm and tepid waters, used externally and internally. The water contains sulphur in a considerable proportion.

*Department of Var.*

*Luc-en-Provence.*—Bicarbonated alkaline ferruginous water. A company capitalized at $100,000 is about to develop the spring known as the Source Poule.

*La Foux.*—A salt water, of which little is known.

*Les Arcs.*—A few ferruginous springs.

*Portoufus.*—Ferruginous waters, with a small proportion of arsenic.

*Department of Hérault.*

*Avène.*—An alkaline water, used externally and internally.

*Bularuc.*—A spring water with a temperature of 48°; chlorureted sodiac; prescribed for paralysis, apoplexy, spinal difficulties, sciatica, wounds caused by firearms, and false anchylosis. The springs are controlled by a well-known establishment, which maintains an établissement.

*Casoul-les-Beziers.*—Two springs of saline waters, containing magnesia; used externally and internally.

*Foncaude.*—A bicarbonated calcic, diuretic.

*Rieumajou.*—A gaseous bicarbonate, tinctured with iron; prescribed for dyspepsia and affections of the urinal organs.

*St. Julien.*—An acid bicarbonated ferruginous water.

*La Malou.*—A water supplying three établissements. The water is prescribed for rheumatism, spinal affections, and all nervous troubles, more especially locomotor ataxis. The waters are without odor; are ferruginous bicarbonated sodiacs.

*La Plaine St. Joseph.*—A chlorureted sodiac of about the same composition as Balaruc.

*Palavas.*—Strong in iron; alkaline and gaseous.

*Rosès.*—Gaseous, bicarbonated calcic; exported.

*La Veyresse.*—A gaseous water, bicarbonated sodiac calcic.

*Department of Garde.*

*Cauvalat.*—Four springs of sulphureted calcics; can be warmed to 70° without apparent change.

*Euzet.*—Five springs of sulphureted bituminous calcics; employed externally and internally. Internally, they are laxative diuretic, and, because of the bitumen which they contain, are prescribed for catarrhal affections, especially for the aged, and also for dyspeptics, to whom they give a good appetite.

*St. Félix de Pallières.*—Lightly ferruginous, bicarbonate; prescribed for chlorosis and dyspepsia.

*Fonsange.*—A sulphureted calcic for external and internal use.

*Les Fumades.*—Several springs, which supply three établissements. These are sulphureted bituminous calcics, are utilized for affections of the breathing organs, and are especially useful to the aged and for herpetic affections. They are exported.

*St. Hippolyte de Citon.*—Drawn from asphalted ground; are sulphureted calcics.

*St. Jean de Ceyrargues.*—Give out a bituminous odor; are sulphated calcics.

*Vergeze.*—Bicarbonated calcics, strongly charged with carbonic acid; exported.

SUPPLEMENT B.—CLASSIFICATION OF THE MINERAL WATERS OF FRANCE.

*Sulphatic soda waters.*

St. Amand.
Amélie-les-Bains.
Ax.
Bagnères-de-Bigorre.
Bagnères-de-Luchon.
Bagnoles de l'Orne.
Barèges.
Barzun.
La Bassère.
St. Boës.
Cadèac.
Caldanetta.
Caldaniccia.
Canavielles.
Carcanieres.
Cauterets.
Challes.
Dolaincourt.
Doubaou de Germs.

*Sulphatic soda waters*—Continued.

Eaux Bonnes.
Eaux Chaudes.
Escaldas.
Escouloubre.
Gazost.
Guagno.
Guitera.
Lasbetz.
Marlioz.
St. Martin-Lantosque.
St. Melany.
Molitg.
Nabias.
Olette.
Pietrapola.
Prechacq.
La Preste.
St. Sauveur.
La Terrasse.

*Sulphatic soda waters*—Continued.

Tramezaigue.
Le Vernet.
Vinça.

*Sulphatic (calcique).*

Aix-les-Bains.
Allevard.
Bagnols.
Batignolles.
Belleville.
Bilazars.
Bio.
La Caille.
Cambo.
Les Camoens.
Cauvelat.
Castera-Verduzan.
Chamonix.
St. Christaux.
Compans.
Echaillon.
Enghien.
Euzet.
Fonsonge.
Les Fumades.
Gamarde.
Gigondas.
Guillon.
Hammam-Mescoutine.
St. Hippolyte.
St. Honoré.
Livry.
Meurchin.
Montbrun.
Montmirail.
Mouniè.
Pierrefonds.
Pont d'Austerlitz.
Puzzichello.
Ramouzens.
La Roche.
Posay.
Terner.
Urban Vacqueyras.
Villefranche.

*Sulphate (mixed).*

Cruzy.
Ginoles.
Montmirail-Vacqueyras.
Rochefort-sur-Mer.
Vaour.
Villemmfroy.

*Sulphate (calciques).*

Aulus.
Audinac.
Bagnères-de-Bigorre.
Barbazan.
Capvern.
Châtel.
Cransac.
Encausse.
Hagecourt.
Hammam-Setif.
St. Jean de Ceyrargues.
Labarthe Rivière.
Larivière-sous-Aiguemont.
Martigny.
Montjaux.
Outrancourt.
St. Parize.
Propiac.
Remoncourt.
St. Vallier.
Vittel.

*Ferruginous waters.*

Amiens.
Barbazan.
La Bauche.
Blaville.
La Bretonmére.
Caldano.
Chabestout.
Château Gontier.
Château Thierry.
St. Christophe.
Clermond Ferrand.
Dinan.
St. Denis sur Loir.
Divonne.
Etuz.
Fontaine Bounelieu.
Forges les Eaux.
Givenchy.
Gramat.
Gresville.
Martigne Briand.
Manton.
Orezza.
Palavas.
Pardina.
Predicroce.
St. Pierre d'Argence.
Porta Prefailles.
Provins.

*Ferruginous waters*—Continued.

St. Quentin.
Renlaique.
Riaille.
Rieumajon.
Roanne.
Rouen.
Roquecourbe.
Sauxillanges.
Stazzona.
Thouarcé.
Villelongue.

*Indeterminate waters.*

Chaudes Aigues.
Condillac.
Evaux.
Evian.
St. Félix des Pallieres.
Forges-les-Bains.
St. Girons.
St. Laurent.
Lavardens.
Néris.
Plombières.
Rennes-les-Bains.
Uriage.
Vauguières.

*Chlorated soda waters.*

Abzac.
Ain Nouissy.
Balaruc.
Bourbon-Lancy.
Bourbon-l'Archambault.
Bourbonnes les Bains.
Hammam-Bon Hadjas.
Hammar Mélouane.
Laplaine St. Joseph.
Lons le Saunier.
Mira.
La Motte.
Oliveto.
Oraas.
Redon.
Roucas Blanc.
Salies-de-Béarn.
Salies-de-Salat.
Salins-du-Jura.
Salins Moutiers.
Santenay.
Sotteville.

*Chlorated bicarbonate waters*

La Bourboule.
Chamolières.
Châteauneuf.
Châtelguyon.
Coren.
Digne.
St. Jean Maurienne.
Maizieres.
St. Maurice.
Medagne.
St. Nectaire.
Prompsat.
Rouzat.
Royat.

*Chlorated sulphatic.*

Brides.
St. Gervais.
Hammam Rhira.
Louch-au-Dreff.
St. Martin de Renacas.
Mortagne.
Phazy.
Pouillon.
Sabusse.

*Chlorated sulphuric.*

Greoux.
Tercis.
Uriage.

*Chlorated (calcique).*

Beaume de Venise.

*Phosphatic (tricolique).*

Pied de Fer d'Aiguemont.

*Soda bicarbonate water.*

Abrest.
Aizac.
Audabre.
St. Andéol.
Argentières.
Asperzac.
Augnat.
Beaulieu.
La Begude.
Bois Lantal.
Le Boulogne.
Bonnefont.
Bussang.
Casteljaloux.
Chambon.
Chens Cusy.
La Preste.

*Soda bicarbonate water*—Continued.

Le Coulet.
Cusset.
Hauterive.
Marcols.
Meylier.
Montbrison.
St. Nyons.
Ogen.
St. Romain le Puy.
Sail les Bains.
Sail sous Couzan.
St. Sauveur de Montaigu.
Le Seguin.
Vals.
Velleron.
Vichy.
St. Yorre.

*Bicarbonate (calciques).*

Alet.
Auteuil.
Bartholey.
Boudonneau.
Bussang.
Pouilly.
Campagne.
Charlieu.
La Chaussee.
Chirols.
Cornillon-en Triévres.
Cours.
Crozardais.
Dieulefit.
Duchanffaud.
Dun-le Poelier.
Foncaude.
Foncirgue.
Fourchamboult.
St. Julien.
Lacvilliers.
Lalezolle.
Latrolliere.
Laval-Alger.
St. Marcel de Crussol.
St. Martin de Redon.
Meyras.
Monestier-de-Clermont.
Montsalut.
Montegut Segla.
Nice.
Oriol.
Passy.
Leplan.

*Bicarbonate (calciques)*—Continued.

Pougues.
La Roche Cardon.
St. Simon.
Sylvanés.
Vergéze.
Villeneuve.

*Bicarbonate (mixed).*

St. Alban.
Amphion.
Aurensan.
Avesnes.
Camarés.
Cassoujours.
Celles.
La Chaldette.
Charbonnières.
Châteldon.
Coise.
Condillac.
Coudes.
Courpières.
Desaignes.
Enval.
La Farette.
Faverolles.
St. Florés.
St. Fortunat.
St. Galmier.
Genestilles.
St. Genes.
Grandrif.
St. Herent.
Jonzac.
Juvinas.
Lacousse.
Lorjailler.
Luc.
Madie.
La Malou.
Mesnil sur l'estree.
Moingt.
Mont Dore.
Neuville sur Saöne.
Neyrac.
St. Pardoux.
Pithiviers.
Pontgibaud.
Pougues.
Quezac.
Renaison.
Roches Santeuil.
Sarcey.

*Bicarbonate (mixed)*—Continued.

Sermaize.
Tessières.
La Versole.
La Veyrasse.
Vic-sur-Cère.

*Bicarbonate chlorate.*

Châtelguyon.
Royat.
Vic-le-Comte.

*Bicarbonate sulphate.*

Contrexéville.
Jenzet.
Monestier-de-Briançon.
Sermaize.
Ussat.
Vittel.

*Bicarbonate sulphate chlorate.*

La Queyre.
Le Scay.

SUPPLEMENT C.—FORMULARY OF THERMAL THERAPEUTICS IN FRANCE—ALPHABETICAL LIST OF THE PRINCIPAL AFFECTIONS AND LOCATIONS SUITABLE FOR THEIR CURE.

*Scrofulous abscesses.*—Local treatment: Compresses and injections of sea waters of Salins, Salies-de-Béarn, acting indirectly on part affected.

General treatment: Torpid scrofulous abscesses, mildly excitable, Salins (Jura), Salies-de-Béarn, Hammam-Mélouane.

Scrofulous erythemas, excitable: Bourbonne, Balaruc, Bourbon-l'Archambault, Luchon, Ax, Cauterets, Olette, Barèges, Enghien.

*Acne.*—(1) External treatment: St. Gervais (Torrent Spring) and Enghien (powders), Luchon, Vichy, Vals.

(2) Internal treatment: (*a*) Scrofulous and lymphatic, La Bourboule and the sulphureteds, Barèges, Allevard, Luchon, Enghien, St. Honoré. (*b*) Arthritic and herpetic, St. Gervais, bicarbonated sodas, and lithian stations generally.

*Adénopathic.*—Iodo-bromide and bromo-chloride: Salins, Salies-de-Béarn, Challes.

*Albuminuria.*—Bicarbonated chlorides: Royat; if there is chloro-anæmia, St. Nectaire, Andabre, and the ferruginous springs.

*Amenorrhœa.*—With uterine congestion and constipation: Montmirail and the sulphureted calciques (calciums).

In scrofulous and torpid lymphatic cases: Salins, La Bourboule.

In nervous cases: Néris.

In scrofulous and lymphatic éréthique cases: Sulphureted sodas, warm waters, Ussat.

*Anæmia.*—After hemorrhage and physiological exhaustion: Ferruginous springs, Bussang, Forges, Orezza, Cransac, Campagne, St. Alban, St. Pardoux, Neyrac, Sylvanes, Andabre, etc.; sulphurous waters, especially those slightly alkaline and ferro-manganesian. Ax, Luchon, Le Vernet, Cauterets, La Preste, Gréoux, Viterbe, Aix-en-Savoie, and weak sulphureted stations are especially suitable to cases of lymphatic chlorosis and to nervous women.

In cases of lymphatic anæmia: Chlorided sodas, chlorided bicarbonated stations, La Bourboule, Le Rouzat, Vic-sur-Cère.

In cases where the obstacle to the normal composition of the blood consists in an affection of the hematopotetic organs by defective assimilation or excretion: Free chlorided sodas.

Glandular anginas: Les Fumades, Allevard, Eaux-Bonnes, St. Honoré, Ax, and the sulphureted waters.

In granulations of arthritic origin: St. Gervais, Royat.

If patient is excitable: Mont Dore; if depressed, Enghien, Pierrefonds, Luchon, Moligt, Le Vernet, Amélie, Cauterets.

*Apoplexy.*—Thermal treatment indicated during period of recovery from cerebral lesions: Bourbonne, Bourbon-l'Archambault, La Motte, Balaruc.

*Arthritism.*—Premonitory period: Chlorided sodas slightly mineralized, Bourbon-Lancy, Mousliers.

In arthritic cases, with gravel: Vichy, Contrexéville, Vittel.

In arthritic cases, with mucous manifestations of the throat: St. Gervais.

In arthritic cases, with pulmonary catarrh: Mont Dore.

In arthritic scrofulous cases: La Bourboule.

In arthritic neuralgic cases: Néris, Luxeuil.

In the first three periods of arthritism, with manifestations on the skin, on the muci, in the joints: Chlorided, sulphated lithian, St. Gervais; bicarbonated chlorides, Royat. Lithian stations may be regarded as the treatment "par excellence" for diathesis.

In the fourth period (cachetic period) the thermal treatment is contraindicated.

*Asthma.*—Catarrhal asthma: Eaux-Bonnes, Amélie, Cauterets, and in general those stations where sulphurous inhalations are employed.

Dry asthma: Mont Dore, Royat, Allevard, mineral waters containing carbonic acid and azote as predominating gaseous principles, and employed in inhalations.

*Locomotor ataxia.*—Thermal treatment contraindicated during the active period; if the affection is slow: Néris, La Malou, Dax, La Motte, Balaruc.

*Azoturie in diabetic cases.*—La Bourboule. Vichy is not contraindicated, as has been pretended.

*Chronic catarrhal bronchitis.*—Sulphureted sodas: Cauterets, Luchon, St. Sauveur, Le Vernet, Amélie, Eaux-Bonnes, Cambo.

If the catarrh is recent, not extended in large blisters: Sulphureted calciums, Enghien, Allevard, Pierrefonds, St. Honoré.

In arthritic cases: St. Gervias, Royat.

In scrofulous cases: La Bourboule.

If the catarrh seems to be maintained by the displacement of herpetic manifestations: Mont Dore.

*Cachexia.*—Cachexy of chloro-anæmics: Weak ferruginous at first appearance; if there is erethism, Evian, Cambo, Bagnères-de-Bigorre.

If depression prevails: Royat, St. Nectaire, Ste. Marguerite, Châteauneuf.

If there is stubborn constipation: Châtelguyon, Aulus, Cransac.

If there is lymphatism or scrofula: La Bourboule chlorided sodas.

If state of stomach permits: Forges-les-Eaux.

*Paludal cachexia.*—With obstruction of the spleen and of the liver: Bicarbonated sodas, Vals, and its ferruginous springs.

With intestinal obstruction: Châtelguyon.

With enteralgia: Plombières, Aulus, Encausse.

With enteralgia complicated by profound anæmia: Encausse, Forges, Luxeuil, Cransac, La Bourboule, St. Nectaire, Châteauneuf.

*Cachexia*, scrofulous in first appearance: Salines (Jura), Salies-de-Béarn, La Bourboule, St. Nectaire.

In all cases of advanced cachexy, or those arising from incurable organic maladies, the thermal treatment is contraindicated.

*Bronchial catarrh.*—See Catarrhal bronchitis.

*Laryngeal catarrh.*—Cauterets (La Raillère), Eaux-Bonnes, Luchon.

*Vesical catarrh.*—Contrexéville, Vittel, Capvern, Pougues, La Preste, in simple catarrh without prostatic hypertrophy, and without stricture of the urethral canal.

For patients debilitated and anæmics with slow digestion: Vichy.

*Vesical catarrh.*—Continued.

In dysuric cases: Waters slightly mineralized, or sulphurous waters rich in organic matter, Evian, La Preste, Moligt.

In cases of injection into the bladder: Contrexéville, Evian, Alet, La Preste, Moligt.

*Brain, softening of.*—Thermal treatment contraindicated in increasing softening.

Softening in apoplectic form in the period of return: Bourbon-l'Archambault, Bourbonne, Balaruc.

*Chlorosis.*—Chlorosis is the diminution of the globules, produced by organic troubles, and the symptoms vary according to the organ or function affected.

For erethric-chlorotic cases: Evian, Forges-les-Eaux.

For arthritic-nervopathic cases: Néris.

For the depressed: Luxeuil, Bagnères-de-Bigorre, Bagnères-de-Luchon, Ax, St. Sauveur, Le Vernet, Cauterets, Moligt, Eaux-Chaudes.

For chloro-anæmics with predominance of uterine neuralgies: Néris, Bagnères-de-Bigorre, Gréoux, Luxeuil, Cauterets, St. Sauveur.

For chloro-anæmic dyspeptics: Pougues, Vichy.

For dysmenorrhœa: Vichy, Royat, St. Nectaire.

For the chloro-anæmic with obstinate diarrhea: Evian, Vichy; with constipation, Châtelguyon, Bourbon-Lancy.

*Constipation.*—Montmirail, Châtelguyon, Aulus, Capvern, Royat.

*Couches (after paraplegia).*—La Malou.

*Stone pock.*—La Bourboule, St. Gervais.

*Cramps in stomach.*—Vichy, St. Alban.

*Cystitis.*—Evian.

*Uterine displacements.*—Vichy, Bourbon-l'Archambault (Scotch vaginal douches, combined with the internal use of water from the Jonas Spring).

*Dermatonosis.*—Eczema subaigu: St. Gervais.

Eczema in strumous cases: Luchon, Cauterets, Ax, Eaux-Chaudes, Amélie, Le Vernet, Gréoux, Moligt, La Preste, Uriage.

In arthritic cases: St. Gervais, Royat, the lithian waters, Cransac, Bagnères-de-Bigorre, Aulus.

In excitable cases: St. Gervais.

Eczema of old standing (ancien), lichénoïde: La Bourboule.

*Dermatonosis in pustulous form.*—Impetigo: Ax, Luchon, Olette, Barèges.

Ecthyna: Salins, Salies, Bourbonne, Aix, Enghien, Barèges.

Acné: St. Gervais, Enghien, Vichy.

Mentagre: Luchon, St. Sauveur, Enghien.

*Dermatonosis in form bullous.*—Pemphyus, rupia: Ax.

*Dermatonosis in squamous form.*—Psoriasis: St. Gervais, Luchon, Ax.

Common leprosy: Foncaude, Salins, Enghien.

Icthyois: Luchon, St. Gervais.

Pityriasis capitis: St. Gervais.

*Dermatonosis in papulous form.*—Lichen: Vichy, La Bourboule.

Prurigo: St. Gervais, Néris, Plombières, Ussat, Neyrac.

*Diabetes.*—Diabetes gras (meat fat): Vichy, Vals.

Diabetic dyspeptics: Vichy, Contrexéville.

Diabetics, excited, anæmics: Evian.

Diabetics, depressed: Capvern.

Diabetics, scrofulous: La Bourboule.

*Diarrhea.*—Chronic enteritis: St. Gervais, Vichy.

Bilious diarrhea, diarrhea of warm climates: Vichy.

*Dysentery.*—Chronic dysentery, dysentery of warm climates: Vichy, Foncaude, Olette, Bagnoles (Orne).

*Dyspepsias.*—Bicarbonated sodas, bicarbonated calciums, ferruginous.

Dyspepsia, simple, slightly accentuated: St. Galmier, Condillac, Châteldon, Desaignes, Orezza.

Dyspepsias, by hyperpepsie and by hypopepsie: Bicarbonated sodas, with a different mode of administration, Vichy, Vals (not ferruginous for sanguine patients, ferruginous for the depressed anæmics), Andabre, Châteldon, Pougues, St. Alban.

For lymphatic dyspeptics: St. Nectaire.

Acid dyspepsia: Vichy, Vals, Alet, Evian, Foncaude.

Dyspepsia, with gastrorrhea: St. Gervais, Brides, Sermaize, Miers, Châtelguyon, Vic-sur-Cère, St. Nectaire, Bondes.

Dyspepsia, flatulent: Luxeuil, La Malou, Plombières, Bourbon-Lancy, Ussat, St. Sauveur, Châtelguyon (washing of the stomach).

*Eczema.*—See Dermatonosis.

*Obstruction of the liver.*—For weak patients and nervous sufferers: St. Alban, Plombières, Aulus, if there is constipation.

For plethoric patients: Bourbonne, Balaruc.

For anæmic and depressed: Luxeuil, Pougues, Cransac, Chaudes-Aignes, Sylvanes.

*Obstruction of the spleen.*—With disturbance of the digestive functions: Vichy, Vals.

For anæmics: Chlorided sodas, Bourbonne, Uriage, and the ferruginous.

With paludian cachexy: La Bourboule.

*Obstruction of the uterus.*—Chlorided sodas, Salins (Jura), Salies-de-Béarn, La Motte.

Obstruction, with granulous ulcerations: Sulphurous, St. Sauveur, Eaux-Chaudes, Barzun-Barèges.

*Children, essential paralysis of.*—Balaruc.

*Enteralgia (rheumatic).*—Mont Dore, St. Laurent, Foncaude, Plombières.

In dyspeptic cases: Vichy.

In nervous cases: Néris, Bagnères-de-Bigorre, Plombières.

*Enteritis.*—Vichy (the hospital Lardy), Plombières, Cambo.

In arthritic cases: St. Geravis.

*Exhaustion, paralysis by.*—Balaruc, Bourbonne, Bourbon-l'Archambault, La Motte, Mont Dore.

*Erosions of the neck of the uterus.*—St. Sauveur, Cauterets, Moligt, Eaux-Chaudes, Barzun-Barèges.

*Stomach, maladies of.*—(1) Atonie: Gaseous alkalies, St. Nectaire; bicarbonated chlorides, St. Maurice, Vic; bicarbonated calciums or mixtures, Châteauneuf, La Malou, Sail-les-Bains, St. Alban, Sail-sous-Couzan, Celles, Alet, Desaignes, Condillac, Châteldon, Renayson, Médague.

(2) Gastralgia in seizures: Vichy, Pougues, St. Alban.

Gastralgia fixed or continuous: Plombières, Luxeuil, Forges (anæmic), Néris, Plombières (neropothic), St. Gervais (arthritic), Bourbon-Lancy, Bagnères-de-Bigorre (rheumatic), Royat, St. Gervais (gouty).

(3) Gastritis, chronic: Evian, Mont Dore, Luxeuil, Plombières, Ussat, Bagnères-de-Bigorre.

(4) Dilatation of the stomach: Châtelguyon.

*Excess, venereal.*—Néris, St. Gervais, Balaruc.

*Uterine fibromata.*—Chlorided sodas: Salins, Salies.

*Fevers, intermittent.*—Campagne, Encausse, La Bourboule, Vichy.

*Fistulas, scrofulous.*—Chlorided sodas, Salins, Salies, injections of sulphureted sea waters.

*Liver, affections of, and of the biliary ducts.*—(1) Period preceding obstruction of liver: Vichy, Vals; if there is constipation, Aulus.

*Liver, affections of, and of the biliary ducts*—Continued.

(2) Obstruction of liver. (See Obstruction.)

(3) Hepatic colics: Vichy, Vals; for weakened temperaments, Contrexéville, Vittel, Pougues, Sermaize, Bourbon-Lancy, Luxeuil, Châtelguyon, Montmirail (Spring Verte), Marigny.

*Furunculosis.*—Uriage, St. Gervais, La Bourboule.

*Ganglionnaries.*—Tuberculous and scrofulous obstructions, on first appearance: Uriage, chlorided sodas; if suppuration seems unavoidable, strong chlorided sodas, Salins, Salies-de-Béarn, compresses of sea waters.

*Ganglions, tuberculous.*—Salins, Salies.

*Goître.*—Challes.

*Gout.*—The thermal treatment is summed up in the lithian medication: Simple alkaline, and chloro-alkaline: Royat, St. Gervais, Vichy.

Contraindication of sulphureteds:

(1) Gout aiguë (rheumatic gout): If the patient is sanguineous, Vichy; if the patient is anæmic, excited, Royat, St. Gervais; if patient is lymphatic or scrofulous, Bourbon-l'Archambault; if patient is neuropathic, St. Gervais, Néris, Luxeuil, Evaux, Dax.

(2) Gout chronic, atonic, white gout: If patient possesses good general condition, Vichy, Bourbonne, St. Nectaire; if there is incipient cachexy, Contrexéville; if there is profound anæmia, with depression, Royat, Sylvanés, Barbotan, Rennes, Luxeuil, and the bicarbonated ferruginous; if there is neuropathy and excitement, St. Gervais, Néris, Bains, Evian; if there are articular determinations without a state of inflammation, Boues de Dax, and St. Amand.

*Gravel.*—(1) Uric gravel: If there is no gout, if general condition is good, Vichy Vals, Le Boulon, and the bicarbonated sodas St. Alban, Celles, Royat, Pougues, Contrexéville, Capvern, and Vittel; if there is dysuria, La Preste, Moligt, Olette, Manhourat, Forges; if there is gout, Martigny, Royat, Vichy (sanguins), Evians (excited), Aulus (constipated sanguins).

(2) Phosphatic or catarrhal gravel: La Preste, Contrexéville, Pougues, St. Alban, Evian, Capvern; if there is constipation, Châtelguyon; if patient is old or debilitated, Cransac, Bussang, Orezza, Passy.

(3) Oxalic gravel: The same stations as for the uric gravel.

*Hemiplegia.*—Balaruc, Bourbon-l'Archambault, Bourbonne, La Motte.

*Hepatic colics.*—See Liver.

*Herpetism.*—In excited cases, with irritable manifestations: St. Gervais.

For anæmic and depressed: La Bourboule, Uriage, Enghien.

*Dropsy.*—Due to an obstacle to the venous circulation, caused by an obstruction of the liver: Vichy; in all other cases, contraindications of the thermal treatment.

*Intestines, affections of the.*—(1) Atony: If patient is arthritic, syphilitic, or herpetic, Pougues and the mixed bicarbonates; if patient is not gouty, Cauterets.

(2) Chronic enteritis: Evian, Plombières, St. Gervais, Cambo, Bagnères-de-Bigorre; in lymphatic, scrofulous cases, and those with rheumatism (not gouty), but depressed by diarrheas of old standing, Cauterets, Manhourat.

(3) Neuroses and neuralgias: Plombières, Néris, Bains, Ussat, Dax, Bourbon-Lancy, Gréoux, Foncaude; if there is anæmia and excitement, Royat, La Malou, Luxeuil.

(4) Diarrhea, seriously chronique or glairy of the large intestine. In cases of excited patients and anæmics, Evian; with lymphatic, scrofulous, syphilitic, or rheumatic patients, Cauterets (Manhourat); with arthritic patients, St. Gervais, Celles.

(5) Chronic dysentery: Vichy, Foncaude, Olette, Bagnoles de l'Orne.

(6) Enteritis (pseudo-membranous): Cauterets (Manhourat).

*Intestines, affections of the*—Continued.

(7) Chronic enteritis, dry, with meteorism on a level with the colons: Montmirail, Aulus, Capvern, and the sulphated calciums.

*Laryngitis.*—Catarrhal laryngitis: Cauterets, Eaux-Bonne, Amélie, Le Vernet. Herpetic laryngitis: St. Gervais, Luchon.

*Lymphatism.*—See Scrofula.

*Maladies, surgical.*—(1) To restore play of muscles weakened by long inactivity, against pseudo-anchyloses: Dax, Aix (Provence), Bains, Bourbon-Lancy, St. Gervais, Gréoulx, Bagnères-de-Bigorre, Encausse.

(2) In lymphatic and scrofulous cases, to modify the atonic sores and assist the elimination of foreign bodies: Luchon, Aix, Cauterets, Bagnoles, Barèges, Amélie, Olette.

(3) Against the induration of the tissues in the fistula courses, cold abscesses, and white tumors: Chlorided sodas, Salins, Salies-de-Béarn, Bourbonne, Bourbon-l'Archambault.

(4) In affections of old standing and very atonic: Boues de Dax, St. Amand, Barbotan.

(5) Twist (entorse), following a simple twist or sprain: Bagnols de la Lozère, Bourbonne, Chaudesaigues, Bourbon-l'Archambault if the patient is depressed, Néris if he is excited, Boues de Dax if there is a persistence of articular stiffness; in twists, with serious lesions, Barèges, Bourbonne, Bourbon-l'Archambault.

(6) Luxations: Amélie, Balaruc, Aix-in-Savoy, Bourbonne if patient is depressed, Néris if he is excited, Boues de Dax.

(7) Hydarthroses, rheumatic: Bourbonne; hydarthroses traumatic: Barèges, Bourbonne.

(8) Fracture—in complicated fractures, with profound abscesses, necrosis, ostéite, where all trace of inflammation has disappeared, Barèges, Bourbonne.

(9) Wounds: Bourbonne, Amélie, Aix, Barèges, Bagnères-de-Luchon.

(10) Shot wounds: Barèges, Bourbonne, Bourbon-l'Archambault.

(11) Scrofulous ulcers: La Bourboule, Bourbonne, Bourbon-l'Archambault; callous and atonic, Barèges; varicose, Barèges.

*Mercurials (accidents).*—Barèges, Cauterets, Luchon, Ax, and the sulphurous.

*Metritis, chronic.*—See Uterus.

*Necroses, scrofulous.*—Salins, Salies-de-Béarn, and the chlorided sodas.

*Nephretics (colics).*—Contrexéville, Vittel, Evian, Capvern, Olette, La Preste.

*Neuroses.*—Waters slightly mineralized, and of medium thermality: Néris, Plombières, Luxeuil, Bagnères-de-Luchon.

In arthritic cases: St. Gervais.

In hysteric cases: Néris, St. Sauveur, Luxeuil, Evian, Royat, La Chaldette, Ussat, Encausse, Foncaude.

In depressed cases: Ax, Luchon, Le Petit St. Sauveur, Bourbon-Lancy, Uriage, Pougues, St. Alban, Vals, Bagnères-de-Bigorre.

*Neuralgias.*—Waters slightly mineralized.

Neuralgia "a frigore:" Plombières (neuralgias gastro-intestinal), Néris (neuralgias, rhumatic, sciatic, lumbago, neuralgias intercostal), Bains (neuralgias of the uterus and of the genito-urinary organs), Dax (muscular rheumatism), Luxeuil (neuralgias in anæmic cases).

If there is diathesis, the water suitable for diathesis will dispel these neuralgias.

In arthritic cases: St. Gervais, Royat, Vals, Bagnères-de-Bigorre.

In lymphatic and scrofulous cases: La Bourboule, Bourbon-Lancy.

*Obesity.*—Brides, St. Gervais, Vichy, Châtelguyon, Montmirail.

*Ovary, obstruction of the.*—Salins, Salies, La Motte.

*Ozæna.*—Challes, sulphureteds, chlorided sodas.

*Paralyses.*—(1) Paralysis of cerebral origin: Balaruc, Bourbonne, Bourbon-l'Archambault, La Motte, during the period of reparation; after the disappearance of cerebral lesions, Bourbon-Lancy, Néris, Plombières, Luxeuil.

(2) Paralysis of spinal origin, after the disappearance of the aigu state: Balaruc, Bourbonne, Bourbon-l'Archambault, La Motte, Barèges, Luchon, Evaux, Miers, Bagnères-de-Bigorre, Ussat, Bagnoles, Aulus, Aix-in-Savoy, Mont Dore, Néris, Plombières, Bourbon-Lancy, Luxeuil, Chaudesaigues.

(3) Paralysis, rheumatic: Néris, Luxeuil, Plombières, Bourbon-Lancy, Mont Dore, Chaudesaigues.

(4) Paralysis, metallic: Mercurials, salts plombiques, or arsenical, hyperthermal waters, Ax, Cauterets, Luchon, Aix-in-Savoy, Le Vernet, Balaruc, Bourbon-l'Archambault, Plombières, Uriage.

(5) Paralysis, traumatic: Weak thermal waters, Luxeuil, Néris, Bourbon-Lancy.

(6) Paralysis, infantine: Balaruc, Bourbon-Lancy.

(7) Hysteric paralysis: Néris, Plombières, Bains, St. Sauveur, Moligt, Olette.

(8) Paralysis from exhaustion, resulting from fatigue, from venereal excess: Balaruc, Bourbon-Lancy, Plombières, Néris, Luxeuil.

(9) Paralysis following severe fevers: If the causative affection be recent, weak waters, Néris, Plombières, Bourbon-Lancy, Mont Dore; if it be of old standing, Balaruc, Bourbonne, Bourbon-l'Archambault, La Motte, Uriage.

(10) Senile paralysis: Balaruc.

*Phthisis.*—The thermal treatment does not affect the tuberculosis, but may be useful in amelioration of conditions.

In lymphatic cases, with a torpid form: Eaux-Bonnes; in cases with catarrhal condition and tendency to hæmoptysis: Mont Dore, Cauterets.

In scrofulous erethric cases: La Bourboule.

In gouty or rheumatic cases: Royat.

*Prophylaxis of the tuberculosis.*—The therapeutic prophylactic is the true indication of the treatment by mineral waters: Chlorided sodas, Salins, Salies.

*Psoriasis, buccal.*—St. Christau.

*Kidneys, maladies of the.*—(1) Chronic calculous nephritis: If the symptoms of inflammation have disappeared, Contrexéville, Martigny, Vittel, Capvern; if there be erethism, Evian; if there be debility, St. Alban, Vals, Royat.

(2) Congestive nephritis: Contrexéville, Aulus, Vichy (Celestins).

*Chronic rhinitis.*—If the patient is sanguine, Vichy; if patient is depressed, rheumatic, not gouty, Enghien, Pierrefonds, Cauterets.

In lymphatic and scrofulous cases: Salins, Salies, and the chlorided sodas La Bourboule.

In arthritic cases: St. Gervais, Royat, Vichy.

In syphilitic cases: Luchon, Cauterets.

In syphilitic cases, sanguineous and congested: Aulus.

*Rheumatism.*—Chronic, with or without gravel, but without gouty complication: Water of a high thermality: Aix-in-Savoy.

In erethic rheumatic cases: Néris, Plombières, Bagnères-de-Bigorre.

In sanguine cases: Mont Dore, Vichy, Vals.

In scrofulous and lymphatic cases: Vichy, Vals, La Bourboule.

For debilitated patients: Uriage, Le Vernet, St. Honoré, Cauterets, Enghien, Encausse, Bagnoles, Bagnères-de-Luchon, Barèges, Moligt, Montmirail (sulphureted alkaline), St. Gervais, Royat, St. Nectaire.

In neuropathic cases: La Malou, Bourbon-Lancy.

*Rheumatism*—Continued.

In cases of chronic rheumatism, with deformation of the joints, or in cases of stubborn muscular rheumatism: Bourbonne, Bourbon-Lancy, Bourbon-l'Archambault.

If all inflammatory phenomenon has disappeared: Dax, St. Amand, Barbotan.

*Scrofula.*—(1) Latent period, corresponding to first infancy: Marine medication.

(2) Active period, second infancy, adolescence: Chlorideds, Salins, Salies, Bourbonne, Bourbon-Lancy, La Motte, Uriage, La Bourboule.

(3) Period of acne: Luchon, Cauterets, Ax, Bagnoles, Amélie, Le Vernet, Olette, Eaux-Bonnes, Allevard, St. Honoré, Barèges, Euzet, Cambo, Enghien, Gréoux.

*Sterility.*—(1) If there is acidity of the vaginal mucus: Vichy.

(2) According to the various pathologic conditions of the uterus: Chlorided sodas, Luxeuil, Néris. (See Uterus).

*Scurvy.*—Chlorided sodas: Salins, Salies.

*Syphilis.*—Cutaneous accidents alone can be treated at the following stations: Cauterets, Luchon, Barèges, Aix-in-Savoy, Challes, Uriage, Bourbonne, Balaruc, La Bourboule.

*Uterus, maladies of the.*—(1) Atony: Is especially met with among lymphatic cases; for depressed patients, Cauterets, Capvern; for excitable patients, Bagnères-de-Bigorre, Eaux-Chaudes, St. Nectarie, St. Alban, Pougues, Plombières.

(2) Chronic metritis: In scrofulous and lymphatic cases, Salins, Salies, La Motte, Bourbonne, Cauterets, Luchon, Amélie, Ax, Bagnoles, St. Sauveur; for neuropathic patients, Néris, Luxeuil, Plombières, St. Laurent, Aix-en-Provence, Bains, Bagnères-de-Bigorre, Ussat, Foncaude; for arthritic cases, St. Gervais, Royat, Vichy.

(3) Uterine tumors, fibrous tumors: Salins, Salies, La Motte, Vichy, for sanguineous women.

Granulations of the neck: Mixed bicarbonates.

For uterine displacements: Forges, Luxeuil, Bourbon-l'Archambault, Plombières.

For difficult menstruation: Uriage.

*Urethra and bladder, affections of the.*—(1) Atony of the bladder and of the urinary organs: Evian, Forges, Bussang, Orezza, Auteuil, Passy; if there is constipation, Evian, Cransac, Contrexéville, Vittel; if there is gout, Vichy, Martigny, La Preste, Vals; if there is depression, Cauterets.

(2) Algies, vesical and urethral, of spinal origin, with gravel, uric or phosphatic: Evian (Cachat).

(3) Angioma, villous, with hematuria: Cransac.

(4) Affections of bladder of old standing, among anæmics: Cransac (ferruginous).

(5) Blenorrhagia, chronic: Pougues, St. Léger, Aulus.

(6) Blenhorrhæa: Aulus; for the constipated, Pougues, Vichy, Vals, La Preste; for anæmics, Vals (La Dominique), Cransac, Orezza, Bussang, Forges.

(7) Vesical catarrh: Martigny-les-Bains.

Catarrh with cystitis of the neck and tenesmi: Evian, Bagnères-de-Bigorre.

Catarrh with gravel phosphatic: La Preste.

Catarrh, mucous or muco-purulent: Contrexéville.

Catarrh, slight and recent: Pougues.

Catarrh, vesical and connected with arthritism: Capvern; in neuropathic cases, Evian, Vals.

Catarrh, vesical, connected with herpetism: St. Sauveur.

Catarrh with rheumatic, gouty, sanguineous, congestive: Aulus.

(8) Phosphatic calculi: St. Léger.

*Urethra and bladder, affections of the*—Continued.

Uric and oxalic calculi: Vals, Vichy, St. Alban, Pougues, Vic, Evian, Capvern, Contrexéville; if there are nephritic colics and dysury, La Preste, Moligt, Olette, Contrexéville, Martigny, Vittel.

(9) Chronic cystitis of the neck: Evian.

(10) Rare emission of urine among constipated, congested, and hypochondriacal patients· Châtelguyon, Aulus, Vittel.

(11) Hypertrophy and induration of the vesical walls: St. Amand.

(12) Hematury: Cransac, Forges-les-Eaux, Passy, Orezza, Aulus, Châtelguyon, Montmirail.

(13) Neuroses and rheumatical neuralgias of the neck of the bladder and of the urethra: Néris, Evian.

(14) Slight palsy and paralysis of the bladder: Boues Dax, St. Amand, Forges-les-Eaux, Evian, Capvern.

(15) Nocturnal pollutions and seminal losses: La Preste.

(16) Troubles of the motor and sensitive nerves of the bladder: St. Amand.

(17) Incontinency of urine among children: Contrexéville; among adults, Contrexéville, Martigny, La Preste, Vals, Vichy, Vittel, Dax, St. Amand, Forges-les-Eaux, Bussang.

(18) Stricture of the urethra, inflammatory strictures: Martigny; with cystitis subaiguë or chronic, Contrexéville, La Preste.

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SUPPLEMENT D.—EXPORTATION.

*Exports from the port of Marseilles during the year 1899 of mineral waters, gaseous and other waters.*

| Destination. | Exports of waters of French and other origin united. | Exports of French waters. |
|---|---|---|
| | *Kilograms.* | *Kilograms.* |
| Russia | 638,239 | 638,239 |
| Denmark | 60 | 60 |
| England | 192,435 | 192,435 |
| Germany | 300 | 300 |
| Holland | 1,075 | 60 |
| Belgium | 18,475 | 18,450 |
| Portugal | 7,550 | 7,550 |
| Spain | 94,974 | 94,157 |
| Austria | 12,610 | 9,575 |
| Italy | 84,829 | 84,791 |
| Greece | 99,662 | 99,662 |
| Roumania | 613,327 | 613,327 |
| Bulgaria | 16,080 | 16,080 |
| Turkey | 259,742 | 258,223 |
| Malta | 13,896 | 13,896 |
| Egypt | 443,205 | 439,955 |
| Tripoli | 2,180 | 2,180 |
| Morocco | 19,863 | 19,263 |
| Africa (eastern coast) | 14,812 | 14,812 |
| Maurice | 49,408 | 49,408 |
| Africa (other countries) | 31,685 | 31,685 |
| India (English colonies) | 101,061 | 101,061 |
| India (Dutch) | 700 | 700 |
| Philippines | 2,800 | 2,800 |
| China | 95,129 | 95,129 |

*Exports from the port of Marseilles during the year 1899, etc.*—Continued.

| Destination. | Exports of waters of French and other origin united. | Exports of French waters. |
|---|---|---|
| | *Kilograms.* | *Kilograms.* |
| Japan | 11,369 | 11,369 |
| Australia | 1,500 | 1,500 |
| United States | 210,558 | 170,638 |
| Mexico | 4,600 | 4,600 |
| New Granada | 15,932 | 3,310 |
| Venezuela | 6,500 | 6,500 |
| Brazil | 175,813 | 175,813 |
| Uruguay | 853,929 | 851,979 |
| Argentine Republic | 324,619 | 293,519 |
| Canada | 4,800 | 4,800 |
| Cuba | 70,870 | 70,870 |
| St. Thomas | 200 | 200 |
| Total | *4,494,787 | †4,398,896 |

*9,888,531.4 pounds. †9,677,571.2 pounds.

The total exportations from France during the year 1899 were 17,087,600 kilograms (37,650,490 pounds).

## NICE.

There are no spas or springs in this consular district the waters of which contain any characteristic qualities. The sale of mineral waters is confined to those coming from the interior of France and from other parts of Europe, and includes products of almost every well-known mineral spring.

Since the 1st of January, 1899, mineral waters coming into the town do not pay the "octroi," or town custom-house, duty, as before.

HAROLD S. VAN BUREN,

NICE, *February 21, 1900.* *Consul.*

## RHEIMS.

There are fifteen sources of mineral water in the consular district of Rheims. Eleven of them are situated in the Department of the Vosges, about six hours' journey by rail from Paris. These are at Contrexéville, Vittel, Martigny, Plombières, Bussang, Heucheloup, St. Belette, Lavacheresse, Larouillie, Blevaincourt, and Narey.

One spring is found at Laiford, in the Department of Ardennes; one at Mont-Martel, Aisne; one at Bourbonne, Haute-Marne; and one at Sermaize, Marne.

Several of these springs are widely known, and the bottled waters are on sale in most of the large cities and towns in France, England, Germany, and Switzerland.

### CONTREXÉVILLE.

This is a noted summer resort, containing a dozen large hotels, several boarding houses, and many furnished cottages. The springs are owned and managed by a stock company, and the waters are sold in all the large cities of Europe.

The waters are said to be a specific for gravel, rheumatism, and gout. The springs have acquired such a reputation that the hotels are crowded every year. Many persons claim that drinking the waters systematically each season keeps them in good health.

There was exported to the United States in 1892, 1893, 1895, and 1896 mineral water from the springs of Contrexéville amounting in the aggregate to 13,400 francs ($2,586.20). The water was consigned to Eisner & Mendelson, New York City.

This covers the entire exportation of mineral waters to the United States from this consular district of which there is any record here.

### VITTEL.

Vittel, only a few miles from Contrexéville, is also a popular summer resort, and people from all parts of the globe are found there during the season. The springs are owned and managed by a stock company with a capital of $325,000.

There are two kinds of water: that from the "grande source," advertised to cure gout, gravel, and diseases generally of the urinary organs, and that of the "source salée," said to cure diseases of the liver, constipation, hepatic colic, etc.

The waters from these springs have a large sale and are advertised to be sold at St. Petersburg, Constantinople, London, Paris, and other capitals in Europe; but there is no record at this consulate showing exportation to the United States.

### MARTIGNY-LES-BAINS.

Martigny is situated on the same line of railroad as Contrexéville and Vittel, about 6 miles from the former. These springs are also very popular. A stock company, with a capital of $425,000, owns and manages the business.

One of the characteristics of the waters of the springs of Martigny is lithia, said to be efficacious in rheumatic gout and uric diathesis.

The association has constructed a complete and luxurious bathing establishment and makes a specialty of the hot and cold baths, with the water from the "saponaceous spring," said to be beneficial in various skin diseases and also in nervous disorders.

### PLOMBIÈRES-LES-BAINS.

These springs are situated in the village of Plombières, a delightful and picturesque spot in the mountains of the Vosges. The resort is well patronized. There are half a dozen large hotels. There are also at least fifty furnished cottages which are let every year.

The patients drink the water from some of the springs; others are used exclusively for bathing. The proprietors have lately constructed one of the most complete and magnificent bathing establishments in France. Hot, cold, and vapor baths are given.

The really important sources of mineral water in this district are:

| Name. | Town or village. | Department. |
|---|---|---|
| Contrexéville | Contrexéville | Vosges. |
| Vittel | Vittel | Do. |
| Martigny-les-Bains | Martigny | Do. |
| Plombières-les-Bains | Plombières | Do. |
| Bussang | Bussang | Do. |
| Heucheloup | Heucheloup | Do. |
| Bourbonne-les-Bains | Bourbonne | Haute-Marne. |
| Sermaize-les-Bains | Sermaize | Marne. |

WM. A. PRICKITT,

RHEIMS, *April 5, 1900.* *Consul.*

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### ST. ETIENNE.

The Department of Loire possesses several mineral springs in activity. They furnish, for the greater part, "table waters." They are cold, sparkling, and alkaline and are preserved without difficulty. The production of the mineral sources of the Loire is very important; the average annual output is 30,000,000 bottles, whereas twenty years ago it did not produce more than 9,000,000 bottles.

Several of the springs have been known from a very remote period. Those of St. Galmier and St. Albans were worked by the Romans; but after the fall of the Roman Empire these sources were abandoned for long centuries, and it was only within the last fifty years that they began again to be seriously utilized.

The method of capping the sources is almost the same everywhere. The bottling is in some cases done at the surface, the water being brought up by means of pumps; but more generally the bottling rooms are established some feet below the hydrostatic level of the mineral waters.

The mineral-water bed of each locality is of considerable extent, and any well bored in the fissured zone is sure to give water of

excellent quality. Consequently, where property was divided, many wells were sunk around the ancient points of emergence. This resulted to the great detriment of the aërated waters, as not only multiplied issues were given to the gas, but surface water got mixed with the subterraneous element. However, in later years companies have taken the place of the small proprietors, and the principal springs are controlled by corporations who have remedied the evils of the old system.

### ST. GALMIER.

The springs of St. Galmier are situated at the base of the little town of the same name. They emerge from the granite close to the tertiary soil of the plain. The works executed at this spot proved that the rock was exceedingly fissured and that certain of these fissures had considerable importance. All the wells (three in number) are in the hands of a company, and, as this establishment is the most important of the region, a detailed description of its method of working will be interesting.

As already mentioned, the company of St. Galmier works three springs—Noel, Remy, and St. Galmier proper—all within a few yards of each other. The waters fill the reservoirs automatically and seem to be inexhaustible. Strongly cemented masonry confines each spring, and from this wall water flows with great pressure through six taps, turned off and on at will. The taps are about 2 feet above the ground and some 30 feet below the floor of the establishment. A man sits at each tap filling the bottles as quickly as they are handed to him (something like seventeen per minute) directly from the taps. With similar rapidity, the bottles are passed to others to be corked by a hand-working machine fed by two men. After receiving the cork and before leaving the tank room, the bottles are carefully examined to see that the water is limpid; if the slightest deposit is observed, the bottle is laid aside and the contents confiscated.

In each tank room is a kind of endless elevator in which is disposed, one over the other, a series of shelves about 2 feet wide, on which baskets of six bottles each are placed, the full one going up to the finishing room and the empty one coming down, this continuing without interruption during working hours. Previous to being sent down by the elevator to be filled, the bottles are washed by a simple mechanical contrivance. A reservoir of ordinary water is fixed as high as the ceiling will allow on one wall of the room; from this, india-rubber tubing conveys the water to a small tank containing six jets, a bottle is turned mouth downwards on each jet, and the water flows into it because of the pressure resulting from difference

of level. By this means, the bottles are quickly and efficiently rinsed.

Arrived at the top floor of the building, the filled bottles are passed on to a man who shaves off what of the cork may project and then are handed to a boy, who dips them in a pot of melted wax—green, yellow, or brown, according to the spring of origin—and seals them, and finally to another boy to receive the paper label. The bottles are then ready to be packed for transportation. The water does not undergo any manipulation; it is delivered to the consumer as it comes from the spring.

The number of workmen employed is about two hundred, and that of the bottles filled each day and ready for transport 68,000.

Each bottle as it comes from the glass works costs the company 2 cents, and the wholesale price of the bottled water per hundred and per wagon of 3,000 is 19 francs ($3.66), or 19 centimes (a little less than 4 cents) per bottle. The freight charges are borne by the buyer.

The establishment ships from 15,000,000 to 18,000,000 bottles yearly, and the waters are so widely known that it is not necessary to dwell long on their merits; it will suffice to say, in giving the analysis, that the salts of bicarbonate of lime and of magnesia predominate. As to the quantity of these mineral waters exported to the United States, it is impossible to give an estimate from this district, as the company of St. Galmier does not ship directly, but through houses established at Havre and Marseilles, which buy the waters in large quantities and send them to all parts of the world.

To retail dealers in the immediate neighborhood, the waters are sold at 5 francs (96 cents) per hundred bottles, but the bottles must be returned.

*Analysis of St. Galmier water.*

| | Grams. |
|---|---|
| Fixed residuum | 1.62 |
| Bicarbonate of soda | 0.3394 |
| Bicarbonate of potash | 0.0308 |
| Lime | 0.296 |
| Magnesia | 0.1499 |
| Sulphuric acid | 0.0329 |
| Chlorine | 0.0994 |
| Silica | 0.044 |
| Carbonic acid | 3.09 |

## SAIL-SOUS-COUZAN.

The little town of Sail-sous-Couzan is situated at the confluence of the Lignon and the Chagnon streams. It possesses important springs which fill 7,000,000 bottles yearly. The waters are very

rich in carbonic-acid gas, slightly charged with bicarbonate of soda, and contain a certain proportion of ferric salts.

### ST. ALBAN AND RENAISON.

The springs of St. Alban and Renaison are situated west of Roanne, at the foot of the Madeleine Mountains. The capping of the waters of St. Alban dates from the Roman period; like those of Renaison, they are very simple, as the springs emerge from fissures in the rock at a very small depth beneath the soil. From both of these localities, 1,500,000 bottles are shipped yearly.

*Analysis.*

| | Grams. |
|---|---|
| Dry residuum | 1.8 |
| Soda $Na_2O$ | 0.506 |
| Potash $K_2O$ | 0.035 |
| Lime | 0.359 |
| Magnesia | 0.0785 |
| Protoxyde of iron | 0.0146 |
| Protoxyde of lithine | 0.0047 |
| $SiO_2$ | 0.057 |
| $So_3$ | Traces. |
| Cl' | 0.0073 |
| $Co_2$ | 3.697 |

### ST. ROMAIN LE PUY.

The ancient source of St. Romain le Puy springs out of the plain at the foot of the "puy" (sugar-loaf eminence) which forms the characteristic feature of the locality. The wells, sunk only ten years ago, have acquired considerable popularity. The output is about 5,000,000 bottles yearly. The waters contain bicarbonate of soda and carbonic-acid gas in some quantity.

*Analysis.*

| | Grams. |
|---|---|
| Dry residuum | 3.4827 |
| $Na_2O$ | 1.4493 |
| $K_2O$ | 0.145 |
| CaO | 0.1784 |
| Mgo | 0.1736 |
| $Al_2O_3$ | 0.1736 |
| FeO | 0.0146 |
| $SiO_2$ | 0.0893 |
| Cl | 0.1141 |
| $So_3$ | 0.0088 |
| $Co_2$ | 4.745 |

### MONTROND.

It was while boring for coal in the neighborhood of the village of Montrond that mineral water of most excellent quality was found at a depth of over 1,500 feet. The moment the water was struck it

burst up with considerable force, rising 40 feet into the air. The water is now brought to the surface by means of a tube. The temperature of the spring is 115° F. at the bottom and 80° F. at the surface.

The waters of Montrond contain a little more bicarbonate of soda than those of St. Romain.

HILARY S. BRUNOT,

ST. ETIENNE, *March 27, 1900.* *Consul.*

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## GERMANY.

### AIX LA CHAPELLE.

This city lies in a valley having somewhat the shape of a caldron, in the hilly country between the highest crust of the fens and the flat Dutch land of Juliers. Aix la Chapelle is closely connected with the neighboring town of Burtscheid, which is built in the valley and on the banks of the Burtscheid Brook. Aix la Chapelle is mentioned authentically as Aquis Grani for the first time in 756. Charlemagne, however, is regarded as the creator of this town and its baths. Many legends link themselves to the great emperor of the Middle Ages, not only with regard to the palace and chapel built by him, but also on account of his having discovered and beautified the baths. A legend tells how Charlemagne lost his way in the thickets near the town, and his horse, happening to tread in the hot water, was frightened. Charlemagne in this way discovered the springs.

#### GEOLOGICAL CONDITIONS OF AIX LA CHAPELLE AND BURTSCHEID.

Both towns are situated on layers of the Devonian formation, which form a saddle in which the Devonian limestone runs in two parallel zones from southwest to northeast. It is from these strata that the thermal springs burst. The space between the two limestone zones is filled with gray slate, often mixed with scattered reniform pieces of limestone. The ground is of the same formation beneath the old town. In the southeastern part of Aix la Chapelle it is covered over to varying depths with débris, mold, gravel, white or bluish-gray clay, and water-worn gray slate. All these layers are stained brown or red in many places by infiltration with iron. The limestone vein at Aix la Chapelle doubtless lies in contact with the coal mines.

This limestone layer is covered in the southwestern part of the town by the hill of the Aachen Wood, which belongs to the chalk formation and consists partly of Aachen sand, green sandy marl, and marl mixed with flints. A group of hills lies in a semicircle about

the town, sending spurs toward it which form the sandy and porous substrata of the western portion of the town as far as the Rheinischer railroad station and part of the Hochstrasse.

Quite in the north of the town, isolated masses of chalk are to be found, namely, three hills separated only by slight depressions and composed chiefly of Aachen sand. One of these hills—the Lousberg—rises to a height of 750 feet above the sea level.

### AIX LA CHAPELLE AND BURTSCHEID SPRINGS.

The thermal springs of Aix la Chapelle and Burtscheid issue from the parallel limestone ranges already mentioned. The waters are scattered through the interstices of the limestone and, generally speaking, follow the same course. These clefts are in communication, and the water can not be lowered in one spring without influencing the level of the water in the other springs and in the limestone. This has been proved many times by both intentional and unintentional experiments during the construction of the bath houses, and can still be observed daily in Aix la Chapelle when the lowest flood gate of the Kaiser Spring is opened. A lowering of the water level takes place, causing at the same time a fall in the water level in the springs which are situated on the same limestone range—Quirinus, Rose, and Cornelius springs. During the laying of the foundations, the system of communicating passages in the limestone was accidently discovered. These had been tunneled by the water in the course of time and again became partly closed and obstructed by stalactites, and they consequently often end blindly in the limestone. The thermal water either flows or stands still in these places, and in some of these natural cavities a collection of gas is found. The gas, however, never reaches a high enough pressure to drive out the thermal water in an effervescing form; it is really forced out by hydrostatic pressure. The similarity in temperature and in the amount of chloride of sodium contained by these springs proves that they have a common source. Corresponding temperatures can be found in all these springs at depths from 4,000 to 5,000 feet. The limestone vein can scarcely reach to so great a depth, and the thermal waters must therefore penetrate through it, so that their actual source is to be sought elsewhere. Experiments carried out by analyzing the limestone prove that this is the case, for this species of stone does not contain the smallest trace of chloride of sodium in which the thermæ are so rich; and, moreover, the quantity of carbonic acid in the springs at their outlets is much greater than would correspond with the amount of bicarbonate in the limestone. According to the careful investigations of Ign. Beissel, there is certainly no doubt that the water which in Aix la Chapelle and Burtscheid springs from the

Devonian limestone has its source in the Silurian and Devonian layers of the Venn and Ardenne mountains, lying to the south of the Aix la Chapelle Valley, and follows the course of a fissure of enormous depth which cleaves the mountains from north to south, thereby opening a passage for the waters pent up within these layers. The difference in the temperature and saline contents of the springs is therefore only the result of cooling, mixture, and dilution which takes place during its passage to the individual outlets. The temperature of the waters used for therapeutical purposes is from 38° to 72° centigrade (100° to 161° F.) and they contain from 22 to 28 grams of carbonates in 10,000 ccm.

A closer insight into the chemical constitution may be gained from the inclosed analysis of the different springs, according to the arrangement of Dr. Fr. Raspe.

From their temperatures these springs belong to the class of thermæ, and they are also characterized as salt by the amount of chloride of sodium which they contain. The richness in sulphur and alkalis of most of these springs further places them in the category of alkaline muriatic sulphur waters.

It may be seen by the inclosed tables that the Burtscheid waters are the hottest and the richest in mineral contents, while the sulphurous principles so important for many therapeutical purposes prevail in the waters of Aix la Chapelle. It is only in the lower lying Burtscheid thermæ, such as the Carl Spring and the Rose Spring, that a slight trace of sulphur is perceptible, and they scarcely reach the strength of the weaker springs of Aix la Chapelle. The stronger sulphuration of the hot springs of Aix la Chapelle is explained by the position of the Devonian limestone from which they burst. These layers extend far over the coal-bearing mountains, and the shale of the hills is particularly rich in organic materials and in iron pyrites. Since the alkaline waters in their subterranean course doubtless come in contact with these iron pyrites, it may be inferred that the various combinations of soda and potash with sulphur arise in this manner. The free carbonic acid contained in the wells partly splits up the sulphites and forms hydrothionic acid, which is immediately absorbed and on issuing from the spring disappears with the other gases.

The Mühlenbad Spring, in Burtscheid, has a temperature of 190° F. and is the hottest spring in all central Europe, hotter even than the Karlsbadsprudel.

Slight fluctuations in the composition and temperature of the springs used for therapeutical purposes have been observed in the course of a considerable time. The variation in temperature,

however, is never more than one or two degrees and is caused chiefly by the gradually increasing formation of stalactites at the place of exit. When the obstructing mass has been removed, the temperature rises with the increased flow to its wonted height. The uninclosed and unused springs which are found on the borders of the limestone range are naturally not influenced by the fresh water circulating in these rocks; the water level, on the other hand, affects the temperature and contents of many springs. This circumstance is of great importance as regards the legal protection of the wells against excavations and mining. However, it may be definitely stated that the springs proper under normal conditions could not be disturbed in either their physical or chemical constitution.

The actual quantity of water delivered by the springs can not be ascertained with certainty, as it varies with the depth of the channel. The exact quantity delivered for bath purposes at present time and with the present depth of stream, after an undisturbed flow of fourteen to seventeen hours, by the so-called upper springs (Kaiser and Quirinus) is 365 cubic yards, and by the lower springs (Rose and Cornelius) 412 cubic yards in twenty-four hours, or, taken together, 777 cubic yards. In Burtscheid, the quantity of water must far exceed 21,350 cubic feet in the same time, for the water from about nine other springs is not included in the calculation. The flow, therefore, from both districts should be 50,000 to 60,000 cubic feet in twenty-four hours.

### MANAGEMENT OF THE SPRINGS.

In 1811, Napoleon I arbitrarily declared these baths and springs to be the property of the State; however, he was generous enough to grant the town the income from the baths for twenty-five years, and after that it was to have an annual compensation of 45,000 francs ($8,685). Later, the baths and houses were restored to the city by Friedrich Wilhelm III, at that time governor of the Rhine provinces.

The Aix la Chapelle springs are leased until 1933 to the Aachener Thermal Water Company, incorporated and limited, capital 240,000 marks ($57,120), with headquarters at Hamburg for all purposes of bottling and sale.

The Burtscheid springs are also leased, and water is bottled under name of "Burtscheider Sprudel water."

### EFFICACY OF WATER.

Aix la Chapelle has been and is still noted as a place for curing gout, rheumatism, syphilis, paralysis, and about all the ills that the human body is heir to except heart and lung troubles. There is no

doubt that the waters are efficacious for the infirm and afflicted, for they have been patronized since the year 700 and have been known the world over since the early days of the Romans. At the present time, about five thousand people visit Aix la Chapelle annually to take the waters. Springs of similar character are found in the Eifel Mountains, and a large bottling establishment exists at Geroldstein.

### SALE OF WATERS IN BOTTLES.

The water from the Aix la Chapelle springs is sold in two forms: Kaiserquelle, which is not charged, and Kaiserbrunnen, which is charged with carbonic-acid gas. They are sold in nearly all countries.

The water from the Burtscheid springs is bottled and sold only in one form, which is charged. These waters are consumed chiefly in the neighborhood; I am informed that the output is approximately 1,000,000 bottles per annum.

### EXPORTS.

Five million bottles of Kaiserbrunnen, or charged water, are sold annually, 1,500,000 to Aix la Chapelle and the balance throughout Germany, Belgium, England, Holland, China, Asia, Australia, France, South America, and the United States. The North German Lloyd and the American Line steamship companies are regular buyers.

The values of exports of mineral water declared through this office for the United States have been:

| | |
|---|---|
| 1896 | $19,617.22 |
| 1897 | 23,786.37 |
| 1898 | 11,582.74 |
| 1899 | 12,030.16 |

The Aachener Thermal Water Company is the sole exporter from this consular district, and it is making every effort to increase its business with the United States, with which the 1897 tariff interfered.

### PREPARATION OF WATER.

The water after being drawn from the springs is cooled and put into bottles and charged with carbonic-acid gas at a pressure of 4 atmospheres. I am informed that water shipped across the Equator has been kept five years.

It is a clear, sparkling, and good table water.

FRANK M. BRUNDAGE,

AIX LA CHAPELLE, *February 21, 1900.* *Consul.*

*Analysis of the water of the various springs in Aix la Chapelle.*

| Constituents. | Quirinus Spring. | Kaiser Spring. | Rosen Spring. | Cornelius Spring. |
|---|---|---|---|---|
| Iodide of soda | 0.0051 | 0.005 | 0.0048 | 0.005 |
| Bromide of soda | 0.036 | 0.036 | 0.036 | 0.036 |
| Sulphate of sodium | 0.0234 | 0.136 | 0.0747 | 0.0544 |
| Chloride of sodium | 25.915 | 26.516 | 25.415 | 24.605 |
| Chloride of lithium | 0.033 | 0.033 | 0.033 | 0.033 |
| Sulphate of soda | 1.516 | 1.527 | 1.54 | 1.566 |
| Sulphate of strontium | 0.003 | 0.0025 | 0.0034 | 0.0024 |
| Bicarbonate of soda | 7.88 | 9.186 | 7.549 | 7.094 |
| Bicarbonate of magnesia | 0.509 | 0.771 | 0.404 | 0.379 |
| Bicarbonate of lime | 2.474 | 2.274 | 2.648 | 1.898 |
| Sesquicarbonate of iron | 0.072 | 0.131 | 0.083 | 0.083 |
| Silicates | 0.62 | 0.661 | 0.593 | 0.597 |
| Organic substances | 0.978 | 0.769 | 0.915 | 0.927 |
| Total | 42.982 | 44.481 | 42.118 | 40.144 |
| Temperature (Fahrenheit) | 120° | 123.5° | 113.7° | 111.7° |

*Analysis of the water of the various springs in Burtscheid.*

| Constituents. | Schuerbad Spring. | Koch Spring. | Victoria Spring. |
|---|---|---|---|
| Iodide of soda | 0.002 | ..... | 0.002 |
| Bromide of soda | 0.017 | ..... | 0.011 |
| Sulphureted hydrogen | ..... | 0.031 | 0.018 |
| Sulphate of sodium | 0.0007 | ..... | ..... |
| Chloride of ammonia | 0.079 | ..... | 0.07 |
| Chloride of sodium | 28.135 | 26.967 | 27.782 |
| Chloride of lithium | 0.11 | 0.0004 | 0.04 |
| Sulphate of potash | 1.685 | ..... | 1.665 |
| Sulphate of soda | 3.075 | 3.788 | 2.783 |
| Sulphate of strontium | 0.007 | 0.067 | 0.042 |
| Bicarbonate of soda | 8.761 | 11.092 | 9.024 |
| Bicarbonate of magnesia | 0.416 | 0.309 | 0.439 |
| Bicarbonate of lime | 2.68 | 1.62 | 2.085 |
| Sesquicarbonate of iron | 0.005 | ..... | 0.025 |
| Bicarbonate of manganese | 0.004 | ..... | 0.007 |
| Phosphate of soda | 0.006 | 0.189 | 0.007 |
| Arseniate of soda | 0.00035 | ..... | ..... |
| Silicates | 0.738 | 0.72 | 0.663 |
| Argillaceous earth | 0.0007 | ..... | ..... |
| Organic substances | 0.026 | ..... ..... | 0.016 |
| Total | 45.749 | 45.473 | 44.688 |
| Temperature (Fahrenheit) | 191° | 189.2° | 111° |

*Gaseous constituents in Aix la Chapelle springs.*

| Constituents. | Kaiser Spring. | Cornelius Spring. | Rosen Spring. | Quirinus Spring. |
|---|---|---|---|---|
| Gases absorbed in water: | | | | |
| Nitrogen | 9 | 7.79 | 9 | 6.41 |
| Carbonic acid | 89.4 | 92.21 | 90.31 | 93.25 |
| Carbureted hydrogen | 0.37 | Trace. | 0.55 | 0.26 |
| Sulphureted hydrogen | ..... | ..... | ..... | ..... |
| Oxygen | 1.23 | ..... ..... | ..... | ..... |
| Total | 100 | 100 | 100 | 100 |

*Gaseous constituents in Aix la Chapelle springs*—Continued.

| Constituents. | Kaiser Spring. | Cornelius Spring. | Rosen Spring. | Quirinus Spring. |
|---|---|---|---|---|
| 100 volumes of water: | | | | |
| Nitrogen | 66.98 | 81.68 | ..... | ..... |
| Carbonic acid | 30.89 | 17.6 | ..... | ..... |
| Carbureted hydrogen | 1.82 | ..... | ..... | ..... |
| Sulphureted hydrogen | 0.31 | ..... | ..... | ..... |
| Oxygen | ..... | ..... | ..... | ..... |
| Total | 100 | 100 | ..... | ..... |
| Absorbed gases set free by boiling in vacuum: | | | | |
| Nitrogen | 12.78 | 12.54 | 14.71 | 7.31 |
| Carbonic acid | 126.94 | 148.46 | 145.4 | 106.3 |
| Carbureted hydrogen | 0.52 | Trace. | 0.89 | 0.3 |
| Sulphureted hydrogen | ..... | ..... | ..... | ..... |
| Oxygen | 1.76 | ..... | ..... | 0.09 |
| Total | 142 | 161 | 161.09 | 114 |
| Total volume of absorbed carbonic acid (free and partly combined carbonic acid) | 251.5 | 283 | 252 | 154 |

*Analysis of 10,000 grams, or 90.8 quarts, of water from Aix la Chapelle springs after being cooled and charged with carbonic-acid gas (Kaiserbrunnen) made by Prof. Justus Liebig.*

| | |
|---|---|
| Chloride sodium | 26. 161 |
| Bromide | 0. 036 |
| Iodide | 0. 005 |
| Sulphide | 0. 275 |
| Sulphate soda | 2. 836 |
| Sulphate potash | 1. 527 |
| Carbonate soda | 6. 449 |
| Carbonate lithion | 0. 029 |
| Carbonate magnesia | 0. 506 |
| Carbonate lime | 1. 579 |
| Carbonate strontia | 0. 002 |
| Carbonate iron oxide | 0. 095 |
| Silicic acid | 0. 662 |
| Organic matter | 0. 769 |

## BRESLAU.

The province of Silesia forms a triangle bordered by the Empire of Russia, Austria, and the province of Brandenburg. Silesia is separated from Austria by a chain of high mountains called the Altvater, Riesen, und Iser Gebirge. These mountains are covered with large pine and other forests and are rich in all kinds of ores and springs. In fact, Silesia owes its prosperity to the wealth and naturally favorable situation of its land. One can find all kinds of mines and manufactories in this province, as well as places for rest. Some of these watering places—for instance, Reinerz, Flinsberg,

Salzbrunn, and Cudowa—are known not only all over Europe, but over the world. The spring waters are either taken pure or mixed with milk or wheys, and for a table drink mixed with wine. They are also suitable for bathing, either pure or mixed with different ingredients.

Each spring is managed by a superintendent, who receives the guests, assigns them to their rooms, and introduces them to the special physician of the spring, who recommends how the water is to be used.

The seven springs of the province of Silesia are: Flinsberg, Salzbrunn, Cudowa, Reinerz, Alt Heide, Goczalkowitz, and Charlottenbrunn.

*Flinsberg* has two springs; they are called the Oberbrunnen (the purest chalybeate spring of the Empire of Germany) and Niederbrunnen. The analysis of 1,000 grams of these waters shows:

| Constituents. | Oberbrunnen. | Niederbrunnen. |
|---|---|---|
| Total of solid elements | 0.45887 | 0.6036 |
| Uncombined carbonic acid | 1,322.966 | 1228 |
| Bicarbonic oxide of iron | 0.03747 | 0.03942 |

Only about 1,000 bottles are sold outside. The water is a remedy for nervousness, blood diseases, woman diseases, pulmonary affections, and heart diseases. It is not charged with acid when bottles are filled.

*Salzbrunn* has one spring called the "Oberbrunnen," a cold alkaline spring. The analysis of 1,000 grams (90.8 quarts) of this water shows:

| | |
|---|---|
| Bicarbonic soda | 2. 152184 |
| Bicarbonic lithium | 0. 013041 |
| Bicarbonic ammonia | 0. 000668 |
| Sulphuric soda | 0. 459389 |
| Sulphuric alkali | 0. 052829 |
| Phosphate of soda | 0. 000064 |
| Chloride of soda | 0. 176658 |
| Bromide of soda | 0. 000782 |
| Iodine of soda | 0. 000005 |
| Bicarbonic lime | 0. 438257 |
| Bicarbonic strontian | 0. 004421 |
| Bicarbonic magnesia | 0. 474004 |
| Bicarbonic oxide of iron | 0. 005706 |
| Bicarbonic protoxide of manganese | 0. 000856 |
| Nitrate of soda | 0. 006 |
| Silicic acid | 0. 03075 |
| Total of the solid elements | 3. 815614 |
| Uncombined carbonic acid | 985. 11 |

The sale of water amounted in 1899 to 1,183,650 bottles, each bottle containing three-fourths of a liter. The export during the year 1898 was as follows:

| | Bottles. |
|---|---|
| To Austria | 29, 844 |
| To England | 2, 560 |
| To Switzerland | 3, 850 |
| To Russia | 208, 024 |

The Oberbrunnen is used for drinking, bathing, and gargling and is a remedy for throat diseases, bronchitis, pulmonary affections, stomach or bowel catarrh, gallstones, gout, and diabetes.

*Cudowa* has two springs, called the "Eugenquelle" and "Gotthold-quelle," the production of which is 50,000 gallons per day. In one pint of water are contained:

| Constituents. | Eugen-quelle. | Gotthold-quelle. |
|---|---|---|
| Chloride of soda | 0.0453 | 0.0741 |
| Chloride of alkali | 0.1105 | |
| Sulphuric soda | 0.3018 | 0.1544 |
| Bicarbonic soda | 1.2173 | 0.7050 |
| Bicarbonic lithium | 0.0081 | 0.0085 |
| Bicarbonic calcium | 0.5740 | 0.6541 |
| Bicarbonic magnesia | 0.0503 | 0.2054 |
| Bicarbonic oxide of manganese | 0.0001 | |
| Bicarbonic oxide of iron | 0.0034 | 0.0301 |
| Protarseniate of iron | 0.0005 | 0.0003 |
| Phosphate of calcium | 0.005 | |
| Clay | 0.0157 | |
| Silicic acid | 0.0845 | |
| Humine substances | 0.210 | |
| Sulphuric alkali | | 0.0560 |
| Uncombined and half-combined carbonic acid | | 1.4582 |
| Entirely uncombined carbonic acid | | 1.0754 |

The quantity of water shipped is about 6,000 bottles a year. It has been proved to be a remedy for chlorosis, anæmia, disintegration, diseases of blood, nerve troubles of the brain, myelitis, paralysis, neuralgia, hysterics, chronic Bright's disease of the kidneys, abdominal diseases of women, pulmonary affection, heart diseases, stomach or bowel catarrh, urinary diseases, Basedow's disease, and chronic rheumatism.

*Alt Heide* has one spring, called the "Josefsbrunnen." In 10,000 parts of this water are contained:

| | |
|---|---|
| Bicarbonic oxide of iron | 0.372 |
| Bicarbonic oxide of manganese | 0.012 |
| Bicarbonic soda | 2.02 |
| Chloride of alkali | 0.11 |
| Sulphuric alkali | 0.517 |
| Bicarbonic alkali | 0.135 |
| Bicarbonic calcium | 8.79 |
| Bicarbonic magnesia | 1.34 |

| | |
|---|---|
| Phosphoric acid | 0.004 |
| Silicic acid | 0.19 |
| Combined carbonic acid | 3.85 |
| Uncombined and half-combined carbonic acid | 17.567 |
| Total of carbonic acid | 21.417 |

The water shipped amounts to about 4,000 bottles a year. In filling this water into bottles, it must be charged with half an atmosphere of carbonic acid. It is a remedy for anæmia, chlorosis, bronchitis, throat diseases, scrofula, and rachitis.

*Reinerz* has nine springs, as follows: Two for drinking and bathing, one for drinking, and six simply for bathing purposes. The analyses of the three main springs, called respectively the Cold Spring, the Temperate Spring, and the "Ulriken" Spring, are as follows:

| Constituents. | Cold Spring. | Temperate Spring. | Ulriken Spring. |
|---|---|---|---|
| Phosphate of alkali | 0.064333 | 0.109878 | 0.074048 |
| Chloride of soda | 0.010029 | 0.012521 | 0.008442 |
| Phosphate of calcium | 0.000168 | 0.000135 | 0.000196 |
| Phosphate of alum | 0.000078 | 0.000108 | 0.000155 |
| Bicarbonic soda | 0.246832 | 0.726342 | 0.380665 |
| Bicarbonic alkali | 0.032218 | 0.154076 | 0.085442 |
| Bicarbonic lithium | 0.000113 | 0.000358 | 0.000037 |
| Bicarbonic calcium | 0.568279 | 1.255556 | 0.748803 |
| Bicarbonic magnesia | 0.222245 | 0.480108 | 0.318083 |
| Bicarbonic oxide of iron | 0.017329 | 0.036619 | 0.004374 |
| Bicarbonic oxide of manganese | 0.00215 | 0.003758 | 0.00169 |
| Silicic acid | 0.038729 | 0.079114 | 0.051625 |
| Arseniate acid | 0.000047 | 0.00018 | 0.000077 |
| Entirely uncombined carbonic acid | 1.866815 | 1.658397 | 1.706257 |

A mineral bath contains in 600 pints of water the following ingredients:

| | Pounds. |
|---|---|
| Bicarbonic lime | 3.8 |
| Bicarbonic soda | 3.6 |
| Bicarbonic oxide of iron | 1.4 |
| Carbonic acid | 32.4 |

The quantity of water shipped is about 6,000 bottles a year, of which a small quantity is exported to Russia and Austria. The Reinerz spring waters are a remedy for pulmonary affections, especially for chronic tuberculosis, chronic catarrh of the throat, anæmia, chlorosis, scrofula, heart diseases, bronchitis, stomach or bowel diseases, inflammation of the urinary organs, neuralgia, malaria, and general weakness of the body.

*Goczalkowitz.*—The waters of this place are said to be rich in solid elements, to have pure combinations of chloride, while sulphur combinations are entirely missing, and to be rich in lithium.

*Charlottenbrunn.*—The springs contain soda and iron, and are a remedy for bowel diseases and anæmia. During the last year, 6,474 bottles were shipped.

The waters of all the above-named springs, excepting Alt Heide, need not be charged with carbonic acid for shipping purposes.

C. W. ERDMAN,
*Consul.*

BRESLAU, *March 10, 1900.*

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## CASSEL.

The most important mineral springs in this consular district are at Wildungen, in the principality of Waldeck-Pyrmont.

The town of Wildungen is situated upon a branch line of the Main-Weser Railway, about 38 kilometers (23.6 miles) from Cassel, province of Hesse-Nassau, Prussia.

The springs of Wildungen, which are known to have been used in the fourteenth century, and perhaps much earlier, are among the oldest in Germany. When they were first used medicinally can not be accurately established, but patients came in the fifteenth century to avail themselves of their healing properties.

From the pamphlet issued by the late Dr. Stoecker and edited by Dr. Marc, I make the following extracts:

There are quite a number of springs in the immediate neighborhood of the town, but the following are mainly in use:

(1) The George Victor Spring.
(2) The Helene Spring.
(3) The Valley Spring.
(4) The Steel Spring.
(5) The King's Spring.

(1) The George Victor Spring is the one nearest to the town and perhaps the one first used; it is now the center of the Wildungen watering establishment. This belongs to the group of alkaline chalybeate springs and contains in every 1,000 parts 1.443 solids. The principal of these are bicarbonate of lime and magnesia and bicarbonate of protoxide of iron in moderate quantities; but besides this, the water is also very rich in free carbonic acid—1,322.2 cubic centimeters. The temperature of the spring is about 10.4° Celsius; the water is clear as crystal, sparkles in the glass, and has an agreeable prickling taste, said by many to slightly resemble ink. As it contains alkaline carbonates, it neutralizes acidity in the stomach, and the large amount of carbonic acids which it holds excites muscular activity and increases the action of the stomach and of the other digestive organs. Soon after taking a few glasses, its effect on the urinary organs is felt. The color of the urine becomes paler, and it shows less specific gravity than is the case after partaking of a like quantity of any other liquid. The continuance of this diuretic action depends on the constitution, the activity of the skin, etc. By a regular use of the cure, the water increases the appetite, strengthens the digestion, and increases the energy

of the whole body. Of its further effects, we will treat more fully when we come to speak of the class of diseases for which it is used.

(2) The Helene Spring is located in a narrow, deeply cut valley, at an equal distance (twenty-five minutes' walk) from both the "spa" (George Victor Spring) and the town proper. Helene Spring is an alkaline chalybeate spring and differs principally from the George Victor Spring in consequence of its constituent parts containing quite three times as much solid matter (4.624 in 1,000). Among these are common salt and bicarbonate of soda, this alone amounting to 1.888, while only a trace of the latter is to be found in the George Victor Spring. The carbonates of lime and magnesia are present in larger quantities (together, 2.632). The amount of free carbonic acid is the same in both springs. This water also is sparkling and clear as crystal, of pleasant prickling and distinctly salty taste, which only slightly resembles ink, as the amount of iron is less than in the George Victor Spring. The temperature is 11.5° Celsius. The action of the acids on the stomach is stronger, owing to the larger quantity of alkali carbonates; but shortly after taking a few glasses digestion becomes more easy, the bowels are less costive, and the bile is more freely secreted. The effect on the urinary organs is stronger and more enduring than that of the George Victor Spring. A longer use of this water deprives the urine of its acids and makes it neutral or even alkaline, which demonstrates the advantages to be derived from its use in all diseases of the urinary organs.

(3) The Thal (Valley) Spring appears to be identical with the Wonder Spring of the old chronicles. For a long time it had gone out of use, until it was examined by Professor Fresenius at the same time as the other springs. According to this analysis, it most closely resembles the George Victor Spring, but contains less solid matter; it may be described as a mild George Victor Spring. As it contains rather more bicarbonate protoxide of iron, has a pleasanter taste, and is easily digested, it is really a very valuable spring, which alone would be sufficient to establish the reputation of any spa. On the whole, however, it is not much drunk, partly because it is rather far away from the principal spa and partly because the two principal springs—the George Victor and the Helene—are amply sufficient. Nevertheless, this remains a valuable reserve spring, to be used in conjunction with the George Victor Spring when it is desired to give a patient rather more iron or if the stomach is unable to bear the stronger waters.

(4) The Steel Spring, a few hundred paces higher up the same valley in which the Thal Spring rises, is a strong, pure iron water, containing more than 0.076 bicarbonate of protoxide in 1,000, and is therefore on an equality with other celebrated iron springs. For the sake of comparison, it may be mentioned that Schwalbach has 0.083; Pyrmont, 0.077; Freiburg, 0.074; and Franzensbad, so much visited for its iron springs, has only 0.041 in 1,000. Free carbonic acid is also strongly marked here—1,237.9 cubic centimeters. The amount of the other solids is but small—only 0.434—and it is therefore easily assimilated.

(5) The King's Spring lies in the small valley which divides Lower from Old Wildungen. This spring, which seems to have been lost sight of for some hundred years, but traditions concerning which were handed down among the people, was rediscovered by Dr. Rörig in 1869 at a depth of about 8 feet. An old conducting pipe, consisting of a hollow tree trunk, showed that it had been used. It has now been relaid and covered with a pavilion and other arrangements made so that it can be drunk on the spot. The bathing arrangements still leave something to be desired, but the baths are very rich in gases—*e. g.*, effervescing. Its analysis shows a rather strong likeness to that of the Helene Spring, but, while richer in chloride of sodium and silicic acid, it is poorer in bicarbonate of sodium, and the effects, therefore, in dispersing acids and curing catarrh are not so well marked as in the use of the before-mentioned spring.

A second spring rediscovered after a still longer period of oblivion lies farther up the valley; but its waters have not yet been analyzed, and, as they are very rich in gases, they have been until now used only for baths.

From the multiplicity of the chemical constituents of the various springs (as iron-containing water, chalybeate, and alkaline muriated springs), it is plain that their healing properties relate to various classes of diseases, these including disturbances of the blood and constitution of the bones, catarrhal affections of the organs of respiration and digestion.

Among the diseases connected with the variations in the constitution of the blood, in which the springs of Wildungen are of special service, are anæmia, for which the George Victor Spring has proved efficacious, while for chlorosis the Helene Spring is more suitable. In nervous diseases, hysteria, certain disturbances of menstruation, the waters are specially suitable; and in certain stages of scrofula and rachitis, where the use of iron and lime is indicated, Wildungen does good service.

For catarrh of the mucous membrane, both of the respiratory and digestive organs, the Helene Spring has, on account of its bicarbonate of sodium and common salt, the happiest effects.

In chronic catarrh of the throat, bronchial tubes, and lungs, it dissolves the viscous phlegm, relieves the expectoration, and by degrees lessens the secretions of mucus caused by the swelling of the membrane; while in catarrh of the stomach and the intestines, with loss of appetite, acidity, constipation, and piles, it gradually excites and regulates the digestion, improves the appetite, loosens the bowels (without causing diarrhea), and increases the secretion of bile. In torpid weakness of the stomach, the Steel Spring, so rich in carbonic acid and iron, is a powerful agent against relaxation.

### DISEASES OF THE URINARY ORGANS.

For relieving and curing almost any disease of the urinary organs, the waters of Wildungen have proved effective. From the time of Hufeland, who wrote an exhaustive account of the springs for the journal which he edited, they have been highly prized in the treatment of such cases by almost all physicians and doctors, and Wildungen has been recommended by them. For a more detailed statement of the use of the Wildungen waters in the diseases herein mentioned, reference is made to the pamphlet above cited—Bad Wildungen and its Mineral Springs, by the late Dr. Stoecker, London, Kegan Paul, French, Trübner & Co., Limited, Paternoster House, Charing Cross Road.

The springs and the grounds upon which they are located belong to the state of Waldeck, but are leased to and managed by a stock association, known by the name "Fürstliche Wildungen Mineralquellen Actien Gesellschaft."

The number of visitors (Kurgüste) or patients was:

| | |
|---|---|
| 1896 | 5,349 |
| 1897 | 5,758 |
| 1898 | 6,178 |

In 1899 there was an increase. In the number for 1898 were included 939 foreigners (104 from the United States).

*Shipment of water in bottles.*

| Year. | Total. | Foreign countries. | United States. |
|---|---|---|---|
| 1896 | 883,368 | 123,458 | 12,000 |
| 1897 | 906,730 | 131,059 | 14,700 |
| 1898 | 974,212 | 143,238 | 12,000 |
| 1899 | (*) | (*) | 15,100 |

NOTE.—The figures for the United States are taken from the invoice book.
* No report.

These mineral waters undergo no kind of manipulation for shipment abroad, but the bottles are filled as the water bubbles out of the ground.

Analyses of the water from the principal springs under the management of the Wildungen Mineralquellen Actien Gesellschaft are given below:

*Analysis of the George Victor, Steel, and Helene springs, Wildungen, by Prof. Dr. Fresenius, at Wiesbaden, in the years 1859 and 1892, respectively.*

| 1,000 parts of water contain— | George Victor Spring. | | Steel Spring, 1859. | Helene Spring, 1859. |
|---|---|---|---|---|
| | 1892. | 1859. | | |
| Bicabonate of soda | 0.065213 | 0.06433 | ..... ..... | 0.845599 |
| Bicarbonate of lithia | 0.00077 | (*) | ..... | ..... |
| Bicarbonate of ammonia | 0.000493 | 0.001515 | ..... | 0.007427 |
| Sulphate of soda | 0.068602 | 0.068745 | 0.005701 | 0.013966 |
| Chloride of sodium | 0.007581 | 0.007765 | 0.007034 | 1.04379 |
| Sulphate of potash | 0.00928 | 0.010888 | 0.007104 | 0.027837 |
| Sulphate of lime | ..... | ..... | 0.010086 | ..... |
| Bicarbonate of lime | 0.731939 | 0.71244 | 0.128223 | 1.26998 |
| Bicarbonate of magnesia | 0.55383 | 0.535584 | 0.180169 | 1.36381 |
| Bicarbonate of barytes | 0.000016 | 0.000309 | ..... | 0.000698 |
| Bicarbonate protoxide of iron | 0.029949 | 0.021022 | 0.076207 | 0.018721 |
| Bicarbonate manganoxydul | 0.00218 | 0.002572 | 0.00904 | 0.001296 |
| Phosphor argilla | 0.000065 | Traces. | ..... | ..... |
| Argilla | 0.000102 | Traces. | ..... | ..... |
| Silicic acid | 0.021677 | 0.01958 | 0.011018 | 0.03106 |
| Total | 1.491697 | 1.44475 | 0.434582 | 4.624184 |
| Free carbonic acid | 2.550242 | 2.508788 | 2.352848 | 2.54629 |
| Total of all ingredients | 4.041939 | 3.953538 | 2.78743 | 7.170474 |

* Not established.

*Reinhardsquelle Spring.*—Besides the springs under the management of the Wildungen Mineralquellen Actien Gesellschaft, there is another spring near Wildungen called the "Reinhardsquelle," which has come into use but recently, although its medicinal properties have been known to the dwellers of the surrounding country for years. Its properties are similar to those of the original Wildungen springs, and it is claimed to be very beneficial in kidney diseases and many other disorders of the urinary organs.

The analysis of this spring is given by Dr. Dietrich, Marburg, in 1,000 parts:

| | |
|---|---|
| Sulphate of potash | 0.007402 |
| Sulphate of soda | 0.02283 |
| Chloride of sodium | 0.00503 |
| Bicarbonate of soda | 0.023047 |
| Bicarbonate of lithia | 0.000626 |
| Bicarbonate of lime | 0.74045 |
| Bicarbonate of magnesia | 0.52624 |
| Bicarbonate protoxide of manganese | 0.002923 |
| Bicarbonate protoxide of iron | 0.0138 |
| Phosphate of lime | 0.00056 |
| Phosphate argilla | 0.00024 |
| Silica | 0.00635 |
| Total | 1.349498 |
| Free carbonic acid | 2.593 |
| Total of all ingredients | 3.942498 |

The temperature is 9.6° Celsius.

The export to foreign countries amounted to—

| | Bottles. |
|---|---|
| 1895 (first year) | 2,124 |
| 1896 | 3,916 |
| 1897 | 7,642 |
| 1898 | 9,355 |
| 1899 | 13,870 |

Seven thousand eight hundred bottles were shipped to the United States in 1899.

The spring and grounds upon which it is located are the private property of a Mr. Goerner, and the management of the spa is under his sole control. Like the waters from the other Wildungen springs, no "improvements" are made in the bottling for export—*i. e.*, the bottles are filled directly from the spring.

### THE ARMINIUS SPRING AT LIPPSPRINGE.

Lippspringe, in which the Arminius Spring is located, is a small town of about 3,000 inhabitants, in the province of Westphalia, Prussia, on the southwest slope of the Teutoburger-Wald, 850 feet above tide water, at the sources of the Lippe River and Jordan Creek. On one side of the town is the Teutoburg forest, and north and west extends the sandy soil of the Senne district. Besides the sources of the Lippe and Jordan, there are a number of other springs and rivulets having their origin within a short distance of Lippspringe. The climate of the place, in consequence of its being sheltered against the north and east winds, is comparatively mild. The temperature is very equable and beneficial to sufferers from lung and throat complaints.

The medicinal qualities of the water were first noticed in 1832. It was last analyzed by Prof. Dr. Koenig, of Münster, Westphalia, January, 1899. It is an azotic lime hot spring with a temperature of 21° Celsius and contains:

| | |
|---|---|
| Carbonic oxide of iron | 0.0077 |
| Carbonate of lime | 0.4771 |
| Sulphate of lime | 0.0511 |
| Sulphate of magnesia | 0.3618 |
| Sulphate of kali | 0.0665 |
| Sulphate of natron | 0.0353 |
| Chloride of sodium | 0.3249 |
| Nitrate of soda | 0.0296 |

The water is efficacious mainly in treating diseases of the lungs and throat. Its internal use sharpens the appetite and regulates digestion.

The analysis of the gaseous components by Professor Zuntz, made in 1873, showed 87 per cent nitrogen and 13 per cent carbonic acid in 100 parts. The gas is inhaled in bath houses and in the pump room, and is good for those afflicted with asthma or catarrh and for persons with defective respiration.

In the first stages of phthisis, astonishing results have been obtained in many cases.

The number of patients coming here for the treatment of diseases of the lungs and throat is steadily increasing.

The shipment of water to foreign countries was about 40,000 bottles last year; its destination was St. Petersburg, Constantinople, etc.

G. C. KOTHE,
*Consular Agent.*

CASSEL, *March 6, 1900.*

## CHEMNITZ.

In answer to Department instructions, I beg to say that I have made investigations and find that no mineral springs exist in this consular district.

J. F. MONAGHAN,
*Vice and Acting Consul.*

CHEMNITZ, *March 10, 1900.*

## COBURG.

There is only one important spring in this district, and that is the "Friedrichshall Bitterwasser" (controlled by the Apollinaris Company, of London). This spring is situated in the village of Lindenau, in the Duchy of Saxe Meiningen. It has been in con-

stant use since the year 1151 and is held in great esteem. In taste it is a salty sweet.

One pound of the water is said to contain the following parts of solids:

| | |
|---|---|
| Chloride of soda | 7.956 |
| Chloride of magnesia | 3.939 |
| Sulphate of magnesia | 5.15 |
| Sulphate of soda | 6.056 |
| Bromide of magnesia | 6.114 |
| Total | 25.696 |

It is exported in very small quantities to the United States, only $600.26 worth going during the last fiscal year. Two small local springs are located at Fechheim and Grubam-Forst (Duchy of Saxe Coburg and Gotha), but they do not export at all.

OLIVER J. D. HUGHES,
COBURG, *February 23, 1900.* *Consul.*

## DRESDEN.

In reply to circular instruction from the Department in reference to the mineral-spring-water industry, I beg to report that, upon careful inquiry, I find there are no mineral-water springs within this consular district.

CHAS. L. COLE,
DRESDEN, *February 23, 1900.* *Consul-General.*

## DÜSSELDORF.

There is no mineral spring of any importance within the limits of this consular district. Quite an extensive trade, however, is carried on from Düsseldorf by the proprietors of the well-known springs near Birresborn, in the vulcanic Eifel Mountains in the Government district of Trier (Treves). The beneficial qualities of the water were known at the time of the Roman settlements and are mentioned in several old descriptive works.

The mineral water of Birresborn is an alkaline chalybeate, rich in free carbonic acid and very rich in bicarbonate of soda, in which it surpasses the waters of several other celebrated German springs. In bicarbonate of lime it does not equal other waters, but surpasses them in bicarbonate of magnesia. In free carbonic acid it exceeds the well-known springs of Fachingen and Selters. It is chemically so composed that it combines the qualities of those springs and stands second to none.

In a little treatise of Professor Fresenius, the celebrated German chemist, I find the following table showing the constituents of five leading German springs, including Birresborn:

*Constituents in 1,000 parts.*

| Constituents. | Birresborn. | Niederselters. | Fachingen. | Geilnau. | Heilbrunn. |
|---|---|---|---|---|---|
| Bicarbonate of soda | 2.851681 | 1.236613 | 3.578608 | 1.06019 | 2.57546 |
| Bicarbonate of lithia | 0.003346 | 0.00499 | 0.007246 | Traces. | 0.00622 |
| Bicarbonate of ammonia | ..... | 0.00684 | 0.001979 | 0.001295 | 0.00777 |
| Bicarbonate of lime | 0.272988 | 0.443846 | 0.62529 | 0.490452 | 0.55116 |
| Bicarbonate of baryta | 0.000154 | 0.000204 | 0.000301 | 0.000193 | 0.00008 |
| Bicarbonate of strontian | | 0.00283 | 0.004031 | Traces. | 0.00007 |
| Bicarbonate of magnesia | 1.092893 | 0.3081 | 0.577024 | 0.363055 | 1.63697 |
| Bicarbonate protoxide of iron | 0.035116 | 0.004179 | 0.005219 | 0.038305 | 0.02949 |
| Bicarbonate protoxide of manganese | 0.000668 | 0.0007 | 0.00877 | 0.004625 | 0.00043 |
| Borate of soda | Traces. | Traces. | 0.000274 | Traces. | Traces. |
| Sulphate of potash | 0.052091 | 0.0463 | 0.047854 | 0.017623 | 0.099 |
| Sulphate of soda | 0.135926 | ..... | ..... | 0.008532 | 0.14763 |
| Chloride of potash | ..... | 0.01763 | 0.039764 | ..... | ..... |
| Chloride of sodium | 0.35762 | 2.33461 | 0.631975 | 0.036151 | 1.41489 |
| Bromide of soda | 0.000363 | 0.000909 | 0.000243 | ..... | 0.0008 |
| Iodide of soda | 0.000005 | 0.000033 | 0.000009 | ..... | 0.00001 |
| Phosphate of soda | 0.000228 | 0.00023 | Traces. | 0.000372 | 0.00018 |
| Nitrate of soda | Traces. | 0.00611 | 0.000963 | Traces. | 0.00046 |
| Phosphate of alumina | Traces. | 0.00043 | Traces. | Traces. | 0.00013 |
| Silicic acid | 0.024532 | 0.02125 | 0.025499 | 0.024741 | 0.02741 |
| Ocherous flakes | ..... | 0.001561 | ..... | ..... | ..... |
| Total | 4.827591 | 4.437365 | 5.555149 | 2.044239 | 6.49816 |
| Free carbonic-acid gas | 2.333967 | 2.235428 | 1.780203 | 2.786551 | 2.39334 |
| Free nitrogen | (*) | 0.004088 | (*) | 0.015525 | Traces. |

*Small quantity.

The water is used as a dietetic support and remedy and is highly recommended by the best German and English physicians, who prescribe it for disorders of the stomach and to people who live highly without taking the necessary amount of exercise. It is in great favor as a table water, on account of its pleasant and refreshing taste.

The water is sold in bottles and jugs and distributed throughout Germany. Large quantities are exported to Great Britain, the United States, and other countries. There are no statistics showing the number of bottles sold yearly or the value of sales, and the proprietors decline to make this known. The value of mineral water exported from this consular district to the United States was:

| | |
|---|---|
| Year ended June 30, 1898 | $3,466.38 |
| Year ended June 30, 1899 | 2,717.05 |
| First three quarters of the present financial year | 2,971.81 |

P. LIEBER,
*Consul.*

DÜSSELDORF, *April 28, 1900.*

## FRANKFORT

There are three groups of mineral springs in the Frankfort consular district whose waters are bottled and shipped.

### KRONTHAL SPRINGS.

These are situated near Kronberg, about 10 miles distant from this city, in the Taunus Mountains. These springs are said to have been celebrated as early as 1560. Montanus, a contemporary of Shakespeare, described them and their wonderful properties in 1593.

The water was first bottled in 1875. In 1899 about 4,000 cases of 50 quarts, and some in pints, were shipped to the United States. The export to Great Britain and Ireland, begun two years ago, amounted to about 10,000 cases in 1899. In Germany, some 2,000,000 bottles were sold last year. Export to other countries is insignificant, Belgium being a limited customer.

The water for export is not treated differently from that for local trade and undergoes the same process as Apollinaris, without the addition of salt.

The springs have recently been bought by an Anglo-German syndicate—the Kronthal Company, Limited, of 53 Berners street, London, W. The German business is managed by the Kronthaler Mineral Quellen Betriebsgesellschaft, of Kronthal, Taunus, Frankfort. The trade for Great Britain and Australasia is controlled by Messrs. Schweppes, Limited, of 53 Berners street, London, W.

The waters of the five springs of the Kronthal group, owned by the syndicate, are bottled under the general name of "Kronthal," but with labels of different colors.

The Kronthal blue label is a delicious table water, to be drunk plain or mixed with wines or spirits or in the form of lemonade, etc. It is very grateful to the stomach, containing a large amount of free carbonic acid.

The Kronthal red label is a highly mineralized water, said to be very effective in cases of gout and stone of the bladder and for eliminating uric acid from the blood. The London Lancet gives the following analysis: Total mineral matter, 3,276 grains per gallon, consisting of 266 grains of sodium chloride, 52.5 grains of calcium carbonate, and 9.1 grains of sodium carbonate, impregnated with its own natural carbonic-acid gas. It is free from any kind of organic impurities.

Kronthal green label is a chalybeate sparkling water. It contains a large amount of iron in the form of a carbonate, is of rather pleasant taste, and is prescribed in cases of anæmia and chlorosis.

### OBER-SELTERS SPRINGS.

These springs are situated at Ober-Selters, in the province of Hesse-Nassau, and are owned by the Nassau Selterser Mineral Spring Company, of Ober-Selters. They have been widely known since 1785 and have been extensively exploited by the company since 1874. The water is bottled as it flows from the springs, without addition of salt; it is impregnated with its own carbonic acid.

The analysis of the water by Dr. Mohr, of Bonn, shows in 1,000 parts—

| | Grains. |
|---|---|
| Sodium carbonate | 0.83568 |
| Ammonium carbonate | 0.00417 |
| Baryum carbonate | 0.00012 |
| Strontium carbonate | 0.00067 |
| Calcium carbonate | 0.2465 |
| Magnesia carbonate | 0.203 |
| Ferrum oxydulate carbonate | 0.00464 |
| Manganese oxydulate carbonate | 0.00042 |
| Sodium chloride | 2.3298 |
| Potassium sulphate | 0.0527 |
| Siliceous acid | 0.042 |
| Total | 3.7197 |

In 100 volumes of the gases of the water are 91.2 carbonic acid, 0.9 oxygen, 7.9 nitrogen. As a medicinal water, it is recommended in nervous depression, febrile diseases, loss of appetite, stomach and intestinal troubles. Mixed with hot milk it is said to be very efficacious in coughs and catarrhal affections of the bronchial tubes.

It is shipped in stone bottles of quarts and pints and in glass bottles, quarts and pints. To the United States, it is shipped almost exclusively in stone bottles, and the company informed me that it shipped 58,750 stone bottles to the United States last year. The total shipments in 1899 were 1,123,796 stone bottles and 461,598 glass bottles.

The water is very extensively drunk in Germany with wines and fruit juices; it does not change the color of fruit juices or wines and neutralizes the acidity of sour wines, rendering them more palatable. The presence of a great amount of carbonic acid renders the water very refreshing.

### TAUNUS SPRING.

This spring is located in the foothills of the Taunus Mountains, near Gross-Karben, in the Grand Duchy of Hesse. The water is called "Taunus," and is the property of an English company—the Taunus Spring Natural Mineral Water Company, Limited, of 3 Throgmorton avenue, London, E. C.

The analysis, as made by Prof. R. Fresenius, of Wiesbaden, is as follows, in 1,000 parts:

| | |
|---|---|
| Chloride of sodium | 1.585525 |
| Chloride of potash | 0.019174 |
| Chloruret of lithium | 0.002269 |
| Chloride of ammonium | 0.005216 |
| Chloride of magnesium | 0.086758 |
| Bromide of magnesium | 0.000282 |
| Iodide of magnesium | 0.00001 |
| Hydrate of sulphuric potassium | 0.060826 |
| Nitric potash | 0.000757 |
| Carbonate of potassium | 1.446748 |
| Carbonate of strontium | 0.003304 |
| Carbonate of baryta | 0.000034 |
| Carbonate of magnesium | 0.223637 |
| Percarbonate of iron | 0.016503 |
| Protoxide of manganese | 0.002338 |
| Phosphate of lime | 0.001009 |
| Silicic acid | 0.016152 |
| Total of solid combinations | 3.475542 |
| Carbonic in conjunction with carbonates | 0.761856 |
| Carbonic entirely free | 2.41483 |
| Total | 6.652228 |

The second analysis is by Mr. Taylor, an English chemist. It is as follows, per gallon:

| | Grains. |
|---|---|
| Chloride of sodium | 179.94 |
| Chloride of potassium | 18.9 |
| Bicarbonate of lime | 95.9 |
| Bicarbonate of magnesia | 12.32 |
| Bicarbonate of soda | 1.4 |
| Sulphate of lime | 4.06 |
| Silica | Traces. |
| Alumina | Traces. |
| Phosphate of lime | Traces. |
| Total | 312.52 |
| Carbonic acid, compressed | 202.58 |
| Carbonic acid, by estimate, in solution | 121.45 |
| Total | 324.03 |

The water is bottled in stone jars and glass bottles as it comes from the spring. It contains a very large amount of carbonic-acid gas. The waste gas is utilized by the company in making liquid carbonic-acid gas for commercial purposes.

The Taunus is a very pleasant sparkling table water, and is also recommended for acidity of the stomach, dyspepsia, and kidney and liver complaints.

The export trade in this water amounted last year to about 2,000,000 bottles and jars, distributed to the United States, England, South America, and Africa.

RICHARD GUENTHER,
FRANKFORT, *March 14, 1900.* *Consul-General.*

## LEIPZIG.

In answer to the Department's circular instruction to report upon the mineral springs located in this consular district and the trade in these waters, I beg to say that, as far as I have been able to ascertain, there are no mineral springs in this district.

BRAINARD H. WARNER, Jr.,
LEIPZIG, *March 17, 1900.* *Consul.*

## NUREMBERG.

There is but one mineral spring worth mentioning in this consular district—the so-called "Fürstenbrunnen," at Kondrau, Bavaria. It is a natural, crystal-clear mineral water and has the rare advantage of being entirely free from iron, and is therefore claimed to be especially suitable for people with weak stomachs. Besides, it contains a good deal of carbonic acid and has a grateful taste, which it keeps even when mixed with wine.

An analysis of this water made by the Imperial Austrian Geological Institute at Vienna gives the following specification:

In 1,000 grams (2.2046 pounds) it contains—

| | Grams. |
|---|---|
| Schwefelsaures Kali (sulphuric kali) | 0.1023 |
| Schwefelsaures Natron (sulphuric soda) | 0.1556 |
| Chlor-Natrium | 1.8778 |
| Kohlensaures Natron (carbonate of soda) | 0.5301 |
| Phosphorsaure Thonerde (phosphoric clay) | 0.0092 |
| Kohlensaure Kalkerde (carbonic calcareous earth) | 0.392 |
| Kohlensaure Magnesia (carbonate of magnesia) | 0.2224 |
| Kieselsäure (silicic acid) | 0.0219 |
| Kohlensäure (carbonic acid) | 2.2346 |

Kondrau is a village in the northwestern corner of Bavaria, near the Bohemian border. The spring rises out of a slaty rock and is owned by a private individual. The water is filled into stone jars on the spot, without any adulteration or admixture of carbonic acid. These jars are similar to those used for the far-famed Seltzer water, which the Kondrau water resembles very much both in taste and composition.

Although exportation of this water has not yet taken place, it is said to be excellently adapted for export, not only to the United States, but to more remote countries. It has its best sale in Bavaria and Bohemia, and generally in Germany and Austria.

Although in existence for many centuries, it is only during the last twenty years that the spring has been utilized. The present annual output is estimated to be 180,000 to 200,000 stone jars of 1 liter (1.056 quarts) each; but I am told that, owing to its good qualities, the demand is continually increasing. The Royal Bavarian Government is one of its largest customers for military hospitals.

The price at the spring is about 2 marks (47 cents) per dozen stone jars of 1 liter each; freight from Kondrau to destination has to be paid by consignee. The jars are loaded into the railroad cars, without any further packing, and are dispatched in half carloads of about 1,800 jars, weighing 11,023 pounds, or whole carloads, weighing 22,046 pounds, containing about 3,600 jars. The freight from Kondrau to Nuremberg, for instance, is $12.50 for half carloads and $23 for whole carloads, including delivery free house.

The water is retailed in this city at 3.24 marks (77 cents) per dozen jars, 24 pfennigs (5½ cents) being refunded if the jars are returned.

GUSTAV C. E. WEBER,

NUREMBERG, *March 20, 1900.* *Consul.*

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## STUTTGART.

The following are the names of the various mineral-water springs in this district:

Teinach, in the district of Kalw.

Goppingen, in the county of Goppingen.

Eyach, in the county of Horb.

Ueberkingen, in the county of Geislingen.

Ditzenbach, in the county of Geislingen.

Berg, in the county of Stuttgart.

Imuan, province of Hohenzollern, Hechingen.

All are bottled and shipped as they come from the springs and are not artificially treated with carbonic acid. None of this water goes to the United States.

Teinach sells over 2,000,000 bottles of half a liter per annum; Goppingen, about 1,200,000 bottles; Eyach, about 1,200,000 bottles; Ditzenbach, about 50,000 jugs; Berg, about 100,000 bottles; Imuan (Fürstenquelle), about 700,000 bottles. Ueberkingen has an old, well-known spring, but the management is now being reorganized.

The waters of Berg, Eyach, and Goppingen are mostly used for the table; Ueberkingen, Ditzenbach, and Imuan, mostly for medical purposes for all sorts of ailings. Teinach has two springs, one for medical and one for table use. The springs are all owned by private individuals.

Teinach, Ueberkingen, Ditzenbach, Berg, and Imuan waters are also used for bathing; there are large and comfortable establishments.

EDWARD F. OZMUN,
*Consul.*

STUTTGART, *March 24, 1900.*

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## GREECE.

There are more than one hundred and fifty mineral springs in Greece, most of which are known to the public only by name, the waters not being put on the market. The waters of about thirty springs are well known and freely used by the public, some of them being managed by the Government and the others by corporations or private individuals.

A number of these springs are hot, and some are used for bathing purposes only. The waters of a few springs are bottled for the market, principal among which are the Cyeellene, Loutraki, and Andros. The waters of Cyeellene and Loutraki are exported in small quantities to other countries of Europe; but none of the mineral water of Greece is sent to the United States. The water of the Edipso Spring, in the Island of Eubœa, is the favorite for home consumption.

The bottled waters undergo no manipulation or artificial change for either home consumption or export. They are simply bottled and sent to the market. The mineral waters of Greece have neither a large export demand nor a very large home consumption. There are no statistics of the sales of these waters, and therefore the quantities can not be given. There are no export duties or taxes on the waters.

The mineral springs of Greece may be divided into two classes, viz:

(1) Springs frequented by or whose waters are used only by neighboring inhabitants. This class includes more than three-fourths of the mineral springs.

(2) Springs well known to the public and frequented by invalids and others from all parts of Greece, Turkey, Egypt, and Asia Minor. The leading springs in this class are Edipso, on the Island of Eubœa; Methana, Island of Methana; Thermia, Island of Cythnos;

Hyptai, near Lammia; Cyeellene, in the Peloponnesus; Corinth; and Loutraki, near Corinth.

Other well-known springs are the Vouliagmeni, in Attica; Agia, Island of Cephalonia; Counoupelion, in the Peloponnesus; Gavrolimui, Island of Milos; and Ochelos, Island of Cerigo.

The therapeutic virtues of the waters of leading springs and their analyses are given as follows:

*Edipso.*—Cures rheumatism, gout, and such diseases, and is very beneficial to convalescents.

*Analysis (quantity, 1,000 cubic centimeters).*

| | Grams. |
|---|---|
| Chloride of potassium | 1.03 |
| Chloride of sodium | 26.5 |
| Carbonate of calcium | 0.5 |
| Sulphate of calcium | 1.83 |
| Chloride of calcium | 2.55 |
| Carbonate of magnesium | 0.033 |
| Chloride of magnesium | 1.14 |
| Carbonate of iron and aluminum | 0.011 |
| Silicic acid | 0.053 |

Temperature, 71.5° centigrade (160° F.).

*Cyeellene.*—Cures diseases of the throat, joints, stomach, kidneys, etc.

*Analysis (quantity, 1,000 cubic centimeters).*

| | Grams. |
|---|---|
| Carbonic-acid gas | 50.47 |
| Sulphuretted hydrogen gas | 12.06 |
| Nitrogen gas | 2.07 |
| Bicarbonate of sodium | 0.167 |
| Carbonate of sodium | 0.4246 |
| Carbonate of iron | 0.0354 |
| Carbonate of manganese | 0.001053 |
| Chloride of sodium | 1.19 |
| Chloride of calcium | 0.07616 |
| Chloride of magnesium | 0.1829 |
| Sulphate of calcium | 0.5406 |
| Sulphate of sodium | 0.149835 |
| Alumina | 0.036 |
| Organic matter | 0.001144 |

Traces of carbonate of potassium, chloride of potassium bromide of sodium, and silicic and phosphoric acids.

Temperature, 27.6° centigrade (78° F.).

*Loutraki.*—Cures diseases of the urinary system and of the stomach.

*Analysis (quantity, 1,000 cubic centimeters).*

| | Grams. |
|---|---|
| Chloride of sodium | 25.8342 |
| Nitrate of sodium | 1.3854 |
| Chloride of potassium | 0.00365 |
| Chloride of lithium | 2.8079 |

| | Grams. |
|---|---|
| Chloride of calcium | 0.0069 |
| Nitrate of calcium | 1.7823 |
| Sulphate of calcium | 1.17295 |
| Chloride of magnesium | 0.9494 |
| Bromide of magnesium | 0.0524 |
| Carbonate of calcium | 0.2526 |
| Carbonate of magnesium | 0.1724 |
| Alumina | 0.0082 |
| Oxide of iron | 0.002 |
| Phosphoric acid | 0.0049 |
| Organic matter | 0.0024 |
| Silicic acid | 0.0622 |

Temperature, 80.2° centigrade (176° F.).

*Methana.*—Cures neuralgia, rheumatism, diseases of the skin, etc.

*Analysis (quantity, 1,000 cubic centimeters).*

| | Grams. |
|---|---|
| Choride of potassium | 1.594 |
| Chloride of sodium | 31.317 |
| Carbonate of calcium | 0.672 |
| Chloride of calcium | 0.083 |
| Sulphate of calcium | 4.173 |
| Carbonate of magnesium | 0.213 |
| Chloride of magnesium | 1.49 |
| Carbonate of iron | 0.027 |
| Peroxide of iron and aluminum | 0.007 |
| Silicic acid | 0.019 |
| Free chlorine | 0.121 |
| Carbonic acid | 1.835 |

Temperature, 29.9° centigrade (84° F.).

DANIEL E. MCGINLEY,
*Consul.*

ATHENS, *June 22, 1900.*

## ITALY.

### LEGHORN.

Tuscany abounds in mineral springs, many of doubtful efficacy or of whose value but little is known and others of recognized worth and celebrated not only in Italy, but over the entire world for their valuable medicinal characteristics. First among these springs, in point of reputation at least, are those of Montecatini, the "Carlsbad of Italy."

Montecatini itself is a small and picturesque village in the province of Lucca, on the railway between Florence and Pisa via Pistoia. It is distant from Florence and Pisa some 35 miles, and 50 miles from this city. The springs are located about three-fourths of a

mile from the village, having their source in the so-called "Val di Nievole." The district which they embrace is about 1 square mile in extent, a few hundred yards separating them one from the other. Many are the property of private individuals, but eight belong to the Government and are under the direct management of a society, to which they are leased by the State. The waters of three of these springs are used exclusively for bathing purposes. They are known as the Bagno Regio, Terme Leopoldine, and Cipollo. The Rinfresco Spring serves for both bathing and drinking, and the other four exclusively for drinking. These are, respectively, the Tettuccio, Olivo, Regina, and Savi waters.

The mineral waters, especially those for drinking, are extremely limpid, without odor, and of a slightly saltish flavor, the strongest a little bitter but by no means unpalatable. Their temperature varies from 22.03° centigrade in the Bagno Regio to 29.75° centigrade in the Leopoldine.

The bathing establishments, hotels, pensions, restaurants, etc., are numerous and commodious, and the prices charged are reasonable. The season is from May 1 to September 30, and during this time thousands of visitors from all parts of Europe come here. In 1899, it is estimated that 50,000 people in search of health and pleasure visited this most delightful locality.

The water is sold in flasks, half flasks, and bottles, and is packed and shipped in cases or baskets at the following prices:

| Description. | Price. | |
|---|---|---|
| Flasks of 2¼ liters* each: | *Lire.* | |
| Case of 24 | 15.70 | $3.03 |
| Case of 18 | 12.20 | 2.31 |
| Case of 12 | 9.00 | 1.74 |
| Case of 6 | 5.20 | 1.00 |
| Basket of 12 | 7.60 | 1.47 |
| Basket of 6 | 4.10 | .79 |
| Half flasks of 1 liter each: | | |
| Case of 48 | 22.90 | 4.41 |
| Case of 36 | 17.60 | 3.40 |
| Case of 24 | 12.60 | 2.43 |
| Case of 12 | 7.00 | 1.35 |
| Basket of 24 | 11.20 | 2.16 |
| Basket of 12 | 5.90 | 1.14 |
| Bottles of 1 liter each: | | |
| Case of 50 | 29.00 | 5.60 |
| Case of 24 | 14.60 | 2.81 |
| Case of 12 | 7.80 | 1.50 |

* 1 liter=1.05 quarts.

By the flask it is sold at 50 centimes (10 cents) each; half flasks, 40 centimes (8 cents); and bottles, 50 centimes. The waters are bottled in their natural state, unless especially ordered otherwise, and are

shipped in large quantities to France, Spain, Algeria, and to South American countries—Brazil, Argentine, and Peru.

### MINERAL SPRINGS AT MONSUMMANO.

Distant but 3 miles from Montecatini and in the same "Val di Nievole" is the famous Grotta of Monsummano. This enormous cavern in the side of the mountain bearing its name is some 984 feet in length, running under the surface at a depth of 16 to 19 feet. Being extremely irregular and tortuous in its formation, its width varies from 3 to 49 feet. Here and there in the diverse points of the Grotta are various thermal springs forming a series of small underground lakes, and rendering the entire atmosphere of the cavern so warm and so charged with humidity as to produce a natural and excellent vapor bath. The temperature of these lakes and of the surrounding atmosphere varies perceptibly, the different portions of the cavern being known respectively as "Paradiso," "Purgatorio," and "Inferno," names sufficiently expressive to leave no doubt as to their meaning.

At the entrance to the Grotta and connected with it by covered corridors is a large bathing establishment and hotel. Ample accommodations, with the usual amusements of a watering place, are provided at this and other establishments in the immediate vicinity for the thousands of people who annually come here for the baths, which are especially efficacious in the cure of rheumatism, paralysis, gout, and various diseases of the blood.

### SAN MARCO LITHIA WATER.

One of the best known and most highly recommended mineral waters in Italy is the San Marco lithia, obtained from a large spring near Grosseto, in the province of Grosseto. Its proximity to the Roman Maremma district with its malarial fevers has prevented any successful attempt to make of it a resort for invalids. The water, however, it is claimed, is the richest in lithia of any known and is bottled and sold in large quantities, in Italy especially. Some 8,000 cases of 50 bottles, each holding 1 liter, are annually exported to England, Spain, Brazil, and other points. It is sold at 27 lire ($5.21) the case f. o. b. Grosseto. The land upon which the spring is located is the property of Cav. Michele Tonci Fabbrini, Turkish consul in this city. This property is for sale.

### ACQUA DELLA SALUTE.

Situated a mile or more from the northern end of Leghorn is a mineral spring known locally as the "Acqua della Salute" (water of health). This water enjoys great favor with the Leghorn people; but no systematic effort has been made to advertise the satisfactory

results obtained from it, and consequently it is scarcely known even in Tuscany. The water has been subjected to careful analysis and is especially recommended for all diseases of the digestive organs. A small domelike edifice has been built over the spring, and the Livornesi enjoy the privilege of drinking it at 10 centimes (1.93 cents) the glass. The number of people, especially among the lower classes, who daily frequent this spring is remarkable.

SPRINGS AT PISA AND LUCCA.

Near Pisa are a number of mineral springs known more particularly because of their value as pleasant bathing resorts in summer. The most popular are the baths of Casciana, Uliveto, San Giuliano, and Cardona. Some 20 miles from Lucca and most attractively situated among the mountains are the baths of Lucca—perhaps, next to Montecatini, the most fashionable inland watering place in Italy, because of its many natural advantages.

JAS. A. SMITH,
*Consul.*

LEGHORN, *April 9, 1900.*

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## MILAN.

In reply to Department circular, I send the following report of the mineral springs located in the consular district of Milan, grouped according to the provinces in which they are found, giving the name of the town where situated, the name of the water (when both bear the same name only one is given), the analysis, and the name of the analyzer.

Most of the waters of the mineral springs in this consular district have merely a local reputation and no sale, but where they do enter into commerce, it will be noted.

Of the nine provinces in this consular district, Cremona is the only one in which mineral springs are not found. The quantity of minerals, gases, and other matter is indicated in the following analyses, expressed in grams or fractions of a gram (15.432 grains) to the kilogram (2.2046 pounds) or to the liter (1.0567 quarts) of water, unless otherwise specified.

PROVINCE OF BERGAMO.

*Berbenno.*

| | |
|---|---|
| Carbonic-acid gas | 0.1325 |
| Hydrosulphuric-acid gas | Traces. |
| Chloride of sodium | 0.0066 |
| Iodide of potassium | 0.0021 |
| Bromide of sodium | Traces. |
| Sulphide of sodium | 0.0126 |
| Manganese | 0.001 |
| Oxide of iron | 0.0031 |
| Alumina | 0.0015 |
| Silicic acid | 0.0105 |
| Sulphate of soda (dry) | 0.0425 |
| Carbonate of soda | 0.3051 |
| Carbonate of lithia | 0.005 |
| Bicarbonate of magnesia | 0.0369 |
| Bicarbonate of lime | 0.0192 |
| Organic matter | 0.0214 |
| Total | 0.6 |

(Analyzed by Bertozzi.)

*San Pellegrino.*

| | |
|---|---|
| Carbonic-acid gas (free) | 0. 2609 |
| Chloride of sodium | 0. 1595 |
| Chloride of magnesium | 0. 0729 |
| Iodide of sodium | 0. 0222 |
| Silicic acid | 0. 0113 |
| Sulphate of soda | 0. 1429 |
| Sulphate of magnesia | 0. 2194 |
| Carbonate of lime | 0. 5972 |
| Carbonate of iron | 0. 0532 |
| Organic matter | 0. 0434 |
| Total | 1. 5829 |

(Analyzed by Ferrario.)

*Fonte di San Pancrazio and di Baronchelli (in Trescore Balneario).*

| | |
|---|---|
| Carbonic-acid gas | 0. 1398 |
| Hydrosulphuric-acid gas (free) | 0. 065 |
| Chloride of sodium | 0. 7143 |
| Chloride of magnesium | 0. 2174 |
| Chloride of calcium | 0. 0851 |
| Iodine | Traces. |
| Silicic acid | 0. 055 |
| Sulphate of soda | 0. 1083 |
| Sulphate of magnesia | 0. 1616 |
| Carbonate of lime | 0. 0889 |
| Organic matter | 0. 115 |
| Total | 1. 9064 |

(Analyzed by Ferrario.)

*Fonte Beroa and Fonte Vecchia (in Zandobbio).*

| | |
|---|---|
| Carbonic-acid gas | 0. 1261 |
| Hydrosulphuric-acid gas | 0. 0655 |
| Chloride of sodium | 0. 6344 |
| Chloride of magnesium | 0. 5726 |
| Iodide of sodium | 0. 2257 |
| Bromides | Traces. |
| Silicon | 0. 0109 |
| Sulphate of soda | 0. 0628 |
| Sulphate of magnesia | 0. 0629 |
| Sulphate of lime | 0. 0217 |
| Carbonate of lime | 0. 2201 |
| Organic matter | 0. 0687 |
| Total | 2. 0714 |

(Analyzed by Ruspini.)

*Sant' Omobono (in Mazzolini and Falghera).*

| | |
|---|---|
| Carbonic-acid gas (free) | 0. 2609 |
| Chloride of sodium | 0. 1595 |
| Chloride of magnesium | 0. 0729 |
| Iodide of sodium | 0. 0222 |
| Silicic acid | 0. 0113 |
| Sulphate of soda | 0. 1429 |
| Sulphate of magnesia | 0. 2194 |
| Carbonate of lime | 0. 5972 |
| Carbonate of iron | 0. 0532 |
| Organic matter | 0. 0434 |
| Total | 1. 5829 |

(Analyzed by Ferrario.)

*Acqua della Fonte and della Torre (in Torre de' Roveri).*

| | |
|---|---|
| Carbonic-acid gas | 0. 1708 |
| Chloride of sodium | 0. 0221 |
| Chloride of magnesium | 0. 004 |
| Chloride of calcium | 0. 008 |
| Silicic acid | 0. 024 |
| Sulphate of soda | 0. 0101 |
| Sulphate of magnesia | 0. 0024 |
| Carbonate of lithia | 0. 0017 |
| Carbonate of magnesia | 0. 1015 |
| Carbonate of lime | 0. 1815 |
| Carbonate of iron | 0. 0209 |
| Organic matter | 0. 0285 |
| Total | 0. 5755 |

(Analyzed by Cenedella.)

*San Fellegrino di Zogno (in Zogno).*

| | |
|---|---|
| Carbonic-acid gas (free) | 0. 0006 |
| Chloride of calcium | 0. 0047 |
| Silicic acid | 0. 008 |
| Sulphate of alumina | 0. 0207 |
| Sulphate of magnesia | 0. 2214 |
| Sulphate of lime | 0. 051 |
| Bicarbonate of magnesia | 0. 0117 |
| Bicarbonate of lime | 0. 3989 |
| Bicarbonate of iron | 0. 0499 |
| Bicarbonate of manganese | 0. 034 |
| Total | 0. 8009 |

(Analyzed by Bertozzi.)

*Acqua del Drago (in Oltre il Colle).*

| | |
|---|---|
| Carbonic-acid gas | 0. 0582 |
| Hydrosulphuric-acid gas | 0. 076 |
| Chlorine | 0. 018 |
| Silicic acid | 1. 7109 |
| Oxide of calcium | 0. 0835 |
| Oxide of magnesium | 0. 076 |
| Alumina and iron | 0. 0573 |
| Organic and lost matter | 0. 3937 |
| Total | 2. 4736 |

(Analyzed by Polli.)

*Brembilla.*

| | |
|---|---|
| Carbonic-acid gas: | |
| Free | 0.0922 |
| Of the bicarbonates | 0.1081 |
| Hydrosulphuric-acid gas (free) | 0.0051 |
| Chloride of sodium | 0.003 |
| Sulphate of sodium | 0.1138 |
| Carbonate of soda | 0.1323 |
| Carbonate of lime | 0.0518 |
| Carbonate of magnesia | 0.0574 |
| Aluminum, with traces of oxide of iron | 0.0368 |
| Silicon | 0.0072 |
| Organic matter | 0.0608 |
| Fixed substances | 0.6732 |

(Analyzed by P. Polli.)

PROVINCE OF BRESCIA.

*Boario (in Gorzano).*

| | |
|---|---|
| Chloride of magnesium | 0.2257 |
| Chloride of calcium | 0.1667 |
| Silica | 0.0525 |
| Sulphate of magnesia (dry) | 0.7901 |
| Sulphate of lime | 0.1575 |
| Sulphate of iron | 0.1675 |
| Carbonate of lime | Traces. |
| Organic matter | 0.115 |
| Total | 1.675 |

(Analyzed by Ferrario.)

*Acqua Nera (in Bovegno).*

| | |
|---|---|
| Carbonic-acid gas (free), 3.8685 cubic centimeters. | |
| Sulphate of magnesia | 0.1562 |
| Sulphate of lime | 0.1177 |
| Carbonate of magnesia | 0.0237 |
| Carbonate of lime | 0.0469 |
| Carbonate of iron | 0.0438 |
| Silicon | 0.0221 |
| Organic matter and chlorides | 0.0198 |
| Total | 0.4302 |

(Analyzed by Commission of Medicine.)

*San Colombano (in Coilio).*

| | |
|---|---|
| Carbonic-acid gas (free), 11.714 cubic centimeters. | |
| Chloride of sodium and organic matter | 0.0083 |
| Silicon | 0.0219 |
| Sulphate of soda | 0.0417 |
| Sulphate of lime | 0.0208 |
| Carbonate of soda | 0.0079 |
| Carbonate of magnesia | 0.0333 |
| Carbonate of lime | 0.0667 |
| Carbonate of iron | 0.0375 |
| Total | 0.2381 |

(Analyzed by Commission of Medicine.)

*Ponte di Legno.*

| | |
|---|---|
| Carbonic-acid gas: | |
| Free | 0.38 |
| Combined | 0.4 |
| Chloride of sodium | 0.1 |
| Chloride of magnesium | 0.02 |
| Iodide and bromide of sodium | Traces. |
| Silicic acid | 0.02 |
| Sulphate of soda | 0.3 |
| Carbonate of lime | 0.85 |
| Carbonate of iron | 0.1 |
| Total | 2.18 |

(Analyzed by Ferrario.)

*Chilo d'Acqua (in Gorzano).*

| | |
|---|---|
| Sulphate of magnesia | 0.0662 |
| Sulphate of lime | 2.175 |
| Sulphate of soda | 0.0177 |
| Carbonate of iron | 0.02 |
| Chloride of potassium | Traces. |
| Chloride of sodium | 0.0076 |
| Aluminum | Traces. |
| Total | 2.2865 |

(Analyzed by Pavesi.)

PROVINCE OF COMO.

*Bellano.*

| | |
|---|---|
| Carbonic-acid gas (free) | 0.0333 |
| Chloride of sodium | 0.065 |
| Chloride of magnesium | 0.11 |
| Chloride of calcium | 0.06 |
| Silicic acid | 0.045 |
| Sulphate of soda | 0.04 |
| Sulphate of magnesia | 0.06 |
| Sulphate of lime | 0.105 |
| Carbonate of magnesia | 0.32 |
| Carbonate of lime | 0.045 |
| Carbonate of iron | 0.1 |
| Organic matter | 0.075 |
| Total | 1.0583 |

(Analyzed by Ferrario.)

*Acqua del Ronchetto (in Como).*

| | |
|---|---|
| Carbonic-acid gas (free) | 0.018 |
| Hydrosulphuric-acid gas | 0.04 |
| Silicic acid | 0.004 |
| Carbonate of magnesia | 0.018 |
| Carbonate of lime | 0.015 |
| Carbonate of iron | 0.19 |
| Ferreous crenato | 0.009 |
| Ferreous apocrenato | 0.011 |
| Total | 0.305 |

(Analyzed by Ferrario.)

*Vassèra (in Induno Olono).*

| | |
|---|---|
| Carbonic-acid gas | —— |
| Chloride of calcium | 0.1 |
| Silicon and organic matter | 0.18 |
| Protoxide of iron | 0.05 |
| Sulphate of magnesia | 0.3 |
| Sulphate of lime | 0.18 |
| Bicarbonate of magnesia | 0.12 |
| Bicarbonate of iron | 0.5 |
| Total | 1.51 |

(Analyzed by Sironi.)

*Luvino.*

| | |
|---|---|
| Carbonic-acid gas | —— |
| Chloride of magnesium | 0.007 |
| Chloride of calcium | 0.007 |
| Silicon | 0.01 |
| Sulphate of lime | 0.042 |
| Carbonate of iron | 0.066 |
| Total | 0.132 |

(Analyzed by Broglia.)

*Fontana Cornasca (in Perledo).*

| | |
|---|---|
| Carbonic-acid gas | 0.12 |
| Chloride of sodium | 0.0525 |
| Chloride of magnesium | 0.08 |
| Chloride of calcium | 0.065 |
| Different iodides | 0.01 |
| Silicic acid | 0.02 |
| Sulphate of soda | 0.05 |
| Sulphate of magnesia | 0.25 |
| Sulphate of lime | 0.03 |
| Carbonate of magnesia | 0.3 |
| Carbonate of lime | 0.09 |
| Carbonate of iron | 0.15 |
| Vegetable and animal matter | 0.065 |
| Total | 1.2825 |

(Analyzed by Tonini and Ferrario.)

*Colletta (in Rovenna).*

| | |
|---|---|
| Carbonic-acid gas (free) | 0.2929 |
| Silicon | 0.0148 |
| Sulphate of alumina | 0.1094 |
| Sulphate of lime | 0.1622 |
| Carbonate of magnesia | 0.0295 |
| Carbonate of iron | 0.0985 |
| Organic matter | 0.0208 |
| Total | 0.7281 |

(Analyzed by Messa and Balzari.)

*Tartavalle (in Taceno).*

| | |
|---|---|
| Carbonic-acid gas (free) | 0.0336 |
| Chloride of sodium | 0.045 |
| Chloride of magnesium | 0.055 |
| Chloride of calcium | 0.125 |
| Silicic oxide | 0.0825 |
| Sulphate of soda | 0.31 |
| Sulphate of magnesia | 0.54 |
| Sulphate of lime | 0.51 |
| Bicarbonate of magnesia | 0.36 |
| Bicarbonate of lime | 0.66 |
| Bicarbonate of iron | 0.085 |
| Organic matter | 0.045 |
| Total | 2.8511 |

(Analyzed by Ferrario.)

*Rigagno (in Taceno).*

| | |
|---|---|
| Carbonic-acid gas (free) | 0.031 |
| Chloride of sodium | 0.02 |
| Chloride of magnesium | 0.035 |
| Chloride of calcium | 0.0725 |
| Silicic oxide | 0.055 |
| Sulphate of soda | 0.1675 |
| Sulphate of magnesia | 0.215 |
| Sulphate of lime | 0.603 |
| Bicarbonate of magnesia | 0.255 |
| Bicarbonate of lime | 0.4025 |
| Bicarbonate of iron | 0.0625 |
| Organic matter | 0.0725 |
| Total | 1.9915 |

(Analyzed by Ferrario.)

*Barco (in Belledo).*

| | |
|---|---|
| Carbonic-acid gas (free) | 0.0214 |
| Hydrosulphuric-acid gas | Traces. |
| Chloride of sodium | 0.0033 |
| Chloride of magnesium | 0.0025 |
| Sulphide of sodium | 0.005 |
| Alumina | 0.0006 |
| Silicon | 0.0096 |

| | |
|---|---|
| Oxide of iron (combined) | 0.0045 |
| Manganese | 0.0005 |
| Sulphate of soda (crystals) | 0.0425 |
| Phosphate of lime | 0.0013 |
| Carbonate of soda | 0.0033 |
| Bicarbonate of magnesia | 0.074 |
| Bicarbonate of lime | 0.1052 |
| Organic matter | 0.0095 |
| Total | 0.2535 |

(Analyzed by Bertozzi.)

PROVINCE OF MILAN.

*Settala.*

| | |
|---|---|
| Carbonic-acid gas | Traces. |
| Oxide of magnesium | 0.2187 |
| Oxide of calcium | 0.0781 |
| Oxide of aluminum | 0.0486 |
| Oxide of silicon | 0.0243 |
| Oxide of iron | 0.0052 |
| Vegetable matter | 0.0347 |
| Lost | 0.0139 |
| Total | 0.4235 |

(Analyzed by Ferrario.)

*San Colombano al Lambro.*

| | |
|---|---|
| Iodide of magnesium | 0.0219 |
| Bromide of magnesium | 0.0281 |
| Chloride of magnesium | 0.3031 |
| Chloride of iodine | 7.1248 |
| Sulphate of magnesium | 0.015 |
| Sulphate of lime | 0.1226 |
| Carbonate of lime | 0.322 |
| Iron (oxide) | Traces. |
| Lithia | Traces. |
| Alumina | 0.018 |
| Total | 7.9555 |

(Analyzed by Pavesi.)

PROVINCE OF PARMA.

*Salso (in Salsomaggiore).*

| | |
|---|---|
| Chloride of sodium | 0.0443 |
| Chloride of potassium | 0.0046 |
| Chloride of magnesium | 0.0802 |
| Chloride of calcium | 0.1766 |
| Iodide of magnesium | 0.0039 |
| Bromide of magnesium | 0.0061 |
| Protoxide of iron | 0.0008 |
| Organic matter | Traces. |
| Total | 0.3165 |

(Analyzed by Cardone and Seveso.)

*Poiere Charray (in Salsomaggiore).*

| | |
|---|---|
| Carbonic-acid gas (free) | —— |
| Chloride of sodium | 0.593 |
| Chloride of magnesium | 0.454 |
| Chloride of calcium | Traces. |
| Iodine | Traces. |
| Silicon | 0.04225 |
| Carbonate of iron | 0.0539 |
| Bicarbonate of soda | Traces. |
| Bicarbonate of lime | 0.0321 |
| Total | 1.17525 |

(Analyzed by Piazza.)

*Regie Saline (in Salsomaggiore).*

| | |
|---|---|
| Carbonic-acid gas | 0.1459 |
| Chloride of sodium | 2.4805 |
| Chloride of lithium | 0.0966 |
| Chloride of magnesium | 0.7265 |
| Chloride of calcium | 1.728 |
| Iodide of magnesium | 0.0127 |
| Silicon | 0.0425 |
| Sulphate of soda | 0.0942 |
| Carbonate of soda | 0.0307 |
| Carbonate of magnesia | 0.021 |
| Carbonate of lime | 0.243 |
| Carbonate of iron | 0.0522 |
| Organic matter | 0.14 |
| Total | 5.8138 |

(Analyzed by Gibertini.)

*Tabiano (in Salsomaggiore).*

| | |
|---|---|
| Carbonic-acid gas | 0.1211 |
| Hydrosulphuric-acid gas | 0.0959 |
| Azote gas | 0.01 |
| Chloride of sodium | 0.0685 |
| Chloride of magnesium | 0.0505 |
| Chloride of iron | Traces. |
| Iodide of sodium | Traces. |
| Sulphide of lithia | 0.0377 |
| Silicon | Traces. |
| Sulphate of soda | 0.0778 |
| Sulphate of magnesia | 0.0213 |
| Sulphate of lime | 1.6756 |
| Bicarbonate of magnesia | 0.028 |
| Bicarbonate of lime | 0.3575 |
| Bicarbonate of iron | 0.0028 |
| Bicarbonate of manganese | 0.0019 |
| Organic matter | Traces. |
| Total | 2.5486 |

(Analyzed by Del Buc.)

*Saline (in Salsomaggiore).*

| | |
|---|---|
| Chloride of sodium | 131. 15 |
| Chloride of lithium | 0. 1675 |
| Chloride of ammonium | 0. 6727 |
| Chloride of calcium | 13. 3087 |
| Chloride of magnesium | 4. 9558 |
| Chloride of aluminum | 0. 0702 |
| Chloride of iron | 0. 1179 |
| Bromide of magnesium | 0. 2093 |
| Iodide of magnesium | 0. 0686 |
| Bituminous matter | 3. 76 |
| Total | 154. 4604 |

(Analyzed by Gibertini.)

*Acqua Madre (in Salsomaggiore).*

| | |
|---|---|
| Chloride of potassium | 4. 57 |
| Chloride of sodium | 44. 25 |
| Chloride of calcium | 176. 65 |
| Chloride of magnesium | 80. 2 |
| Bromide of magnesium | 6. 09 |
| Iodide of magnesium | 3. 85 |
| Protoxide of iron | 0. 46 |
| Organic matter | 0. 3 |
| Total | 316. 37 |

(Analyzed by Cardone and Seveso.)

*Ferrugginose di Salsomaggiore (Salsomaggiore).*

| | |
|---|---|
| Carbonic acid | 0. 145 |
| Carbonate of soda | 0. 0317 |
| Carbonate of lime | 0. 243 |
| Carbonate of magnesia | 0. 021 |
| Carbonate of iron | 0. 0522 |
| Sulphate of soda | 0. 0942 |
| Chloride of sodium | 2. 4805 |
| Chloride of lithium | 0. 0966 |
| Chloride of calcium | 1. 728 |
| Chloride of magnesia | 0. 7265 |
| Iodide of magnesium | 0. 1257 |
| Silicon | 0. 0425 |
| Organic matter | 0. 14 |
| Total | 5. 7848 |

(Analyzed by Gibertini.)

PROVINCE OF PAVIA.

*Molla (in Miradolo).*

| | |
|---|---|
| Carbonic-acid gas (free) | 0. 0418 |
| Chloride of sodium | 7. 5 |
| Chloride of magnesium | 0. 75 |
| Chloride of calcium | 0. 35 |
| Iodide of sodium | 0. 3875 |
| Bromide of sodium | 0. 225 |
| Silicic acid | 0. 15 |
| Carbonate of magnesia | 0. 125 |
| Carbonate of lime | 0. 175 |
| Carbonate of iron | 0. 125 |
| Organic matter | 0. 15 |
| Total | 9. 15 |

(Analyzed by Ferrario.)

*Sales (in Rivanazzano).*

| | |
|---|---|
| Carbonic-acid gas | 0. 2356 |
| Hydrosulphuric-acid gas | 0. 0259 |
| Chlorine (combined with metals) | 39. 4843 |
| Iodine (combined with metals) | 2. 6 |
| Bromine (combined with metals) | 0. 7 |
| Sodium (combined with the alkaloids) | 23. 2502 |
| Potassium (combined with the alkaloids) | 0. 0561 |
| Ammonia combined with the alkaloids) | 0. 0706 |
| Magnesium (combined with the alkaloids) | 1. 2484 |
| Calcium (combined with the alkaloids) | 0. 9178 |
| Sulphuric-acid gas | 0. 0515 |
| Silicic acid | 0. 15 |
| Iron carbonate | 0. 1 |
| Organic matter | 0. 575 |
| Total | 69. 5654 |

(Analyzed by Ferrario.)

*Sant' Antonio (in Broni).*

| | |
|---|---|
| Carbonic-acid gas (free and of the bicarbonates) | 0. 1045 |
| Hydrosulphuric-acid gas (free) | 0. 0185 |
| Chloride of sodium | 0. 0547 |
| Chloride of magnesium | 0. 0056 |
| Chloride of calcium | 0. 0142 |
| Sulphide of calcium | 0. 0015 |
| Silicic acid | 0. 0003 |
| Oxide of iron, of manganese, and lost | 0. 0003 |
| Sulphate of soda | 0. 0315 |
| Sulphate of magnesia | 0. 0096 |

| | |
|---|---|
| Sulphate of lime | 0.0477 |
| Carbonate of soda | 0.0145 |
| Carbonate of magnesia | 0.062 |
| Carbonate of lime | 0.1274 |
| Organic matter | 0.0003 |
| Total | 0.4926 |

(Analyzed by Sozzani.)

PROVINCE OF PIACENZA.

*Castellarquato.*

| | |
|---|---|
| Carbonic-acid gas (free) | 0.03036 |
| Hydrogen sulphate | 0.01122 |
| Azote | 0.02386 |
| Bicarbonate of lime | 0.22054 |
| Bicarbonate of magnesia | 0.17989 |
| Bicarbonate of iron | 0.00734 |
| Sulphate of strontium | 0.00604 |
| Sulphate of lime | 0.05879 |
| Sulphate of potash | 0.01672 |
| Sulphate of manganese | 0.08091 |
| Bromide of magnesium | 0.00339 |
| Iodide of magnesium | 0.00016 |
| Alumina | 0.01121 |
| Silicic acid | 0.00262 |
| Hyposulphate of lime | 0.00094 |
| Phosphate of lime | 0.01074 |

(Analyzed by G. Korner.)

PROVINCE OF SONDRIO.

*San Martino (in Bormio).*

| | |
|---|---|
| Carbonic-acid gas (free and semi-liberated) | 0.0474 |
| Chloride of sodium | 0.0112 |
| Silicic acid | 0.0207 |
| Sulphate of soda | 0.0604 |
| Sulphate of potash | 0.0181 |
| Sulphate of magnesia | 0.252 |
| Sulphate of lime | 0.4863 |
| Carbonate of lime | 0.1735 |
| Carbonate of protoxide of iron | 0.0025 |
| Carbonate of protoxide of manganese | 0.0014 |
| Total | 1.0735 |

(Analyzed by Planta Reichenaul.)

*Masino (in Morbegno).*

| | |
|---|---|
| Chloride of sodium | 0.0224 |
| Chloride of potassium | 0.0029 |
| Iodide of sodium | Traces. |
| Fluoride of calcium | 0.0001 |
| Alumina | 0.0019 |
| Silicic acid | 0.0126 |
| Sulphate of soda | 0.2966 |
| Sulphate of potash | 0.009 |
| Sulphate of magnesia | 0.0215 |
| Sulphate of lime | 0.0486 |
| Phosphate of lime | 0.0001 |
| Carbonate of magnesia | 0.0228 |
| Carbonate of lime | 0.0424 |
| Carbonate of iron | 0.0081 |
| Organic matter | 0.021 |
| Total | 0.51 |

(Analyzed by Bertozzi.)

*Acqua forte di Santa Caterina (in Valfurva).*

| | |
|---|---|
| Carbonic-acid gas | 1.416 |
| Chlorine | 0.0017 |
| Oxide of sodium | 0.065 |
| Oxide of potassium | 0.016 |
| Oxide of magnesium | 0.0536 |
| Oxide of calcium | 0.3097 |
| Oxide of silicon | 0.0293 |
| Oxide of lithium | Traces. |
| Oxide of rubidium | Traces. |
| Sesquioxide of aluminum | 0.0305 |
| Sesquioxide of iron | 0.0544 |
| Sesquioxide of manganese | 0.0032 |
| Sulphuric acid | 0.0944 |
| Total | 2.0738 |

(Analyzed by Pavesi.)

CURATIVE PROPERTIES OF WATERS.

The waters of San Pellegrino are well known and have quite an extensive sale. They are given for constipation, herpes, scrofula, and syphilis. The patient is directed to commence with four or five glasses—each glass to hold 150 grams (5.2911 ounces)—per day, increasing by degrees to twenty per day; then, when the water has

taken effect, which is usually in twenty to thirty days, to slowly decrease to the number started with. The waters sell for 70 centesimi (13 cents) per bottle.

The Fonte Beroa waters are used for drinking, bathing, douches, and mud baths, the Fonte Vecchia for baths only. These waters are prescribed for scurvy; lymphatic, glandular, or osseous tumors; contraction of the tendons and ligaments, gout, hypertrophy of the liver and spleen, paralysis, hypochondria, hysterics, rheumatism, etc. They have a yearly sale of some 35,000 hectoliters (9,246.3 gallons).

Sant' Ombono is taken for herpetic troubles, rheumatism, gout, catarrh, leucorrhœa, ophthalmia, scurvy, etc. Relief usually comes in from twenty to thirty days, but the water should be continued. It is taken early in the morning, commencing with half a glass; then as the stomach gains tone and is able to bear it, increasing to two glasses. This water sells for 60 centesimi (11 cents) per bottle.

The Tartavalle waters are prescribed for diseases of the liver, gravel, inflammation of the stomach and intestines, lithiasis, and amenorrhœa. Relief is generally obtained in from fifteen to twenty days. Price per bottle, 80 centesimi (15 cents).

The Salsomaggiore springs are situated in the midst of a fertile plain and have given the place its name.

The Acqua Madre (mother water), although placed in the foregoing list of mineral springs, is not a natural mineral water, but is condensed from the natural water as follows: The chloride of sodium is extracted and evaporated in large iron boilers; after the extraction of the salt there remains in the boiler a sediment of more soluble salts, known as the Acqua Madre.

All the waters for drinking, bathing, inhalations, and irrigations, whether used at the baths or sold, are sterilized, sealed, and bear the name of the chemical professor of the company—Joseph Cavezzali.

The waters of Salsomaggiore have, so far as I can learn, no exportation to the United States—at least none go through this consulate; but they are exported to South America—especially to Buenos Ayres—to England, Egypt, Switzerland, Austria, and Germany. It might be well to state here that there is no exportation of mineral waters to the United States from this consular district, and that the total export from all Italy to other countries, of both natural and artificial waters, amounted in 1898—I have no later statistics—to $21,245.82.

The Sales waters are considered among the best, and are given in lymphatic and glandular troubles, pulmonary affections, scrofula, caries of the bones, and in venereal diseases. This water is a little

stronger in minerals during the summer months than in the winter, especially in iodine. Price per bottle, 80 centesimi (15 cents).

Valfurva is a little village very well known on account of its mineral springs. It lies amid high mountains, which are covered with snow most of the year. During the bathing season, that portion of the town where the springs are located is called Santa Caterina, and has its own office, etc. These waters have the reputation of being very efficacious in digestive troubles, diseases of the liver and spleen, in gout, gravel, and for weak stomachs. It is exported to South America, but in what quantities I am unable to learn. Price per bottle, 70 centesimi (13 cents).

The bottles on which the foregoing prices have been given hold about 1 liter (1.0567 quarts); a large discount—in some cases 50 per cent—is made when purchased in great quantities.

### BATHING REGULATIONS.

The royal bathing establishments at Salsomaggiore—a concession granted to Guido Delle Rosa & Co.—are open from May 1 to October 31, and are supplied with all the paraphernalia necessary to such establishments. Although the extracting of salt from the waters of the springs at Salsomaggiore dates back, according to report, to some two hundred years before the Christian era, it is only since 1839 that any use has been made of the waters for therapeutical purposes. But it will be seen from the following notes, which I am able to present through the courtesy of the management of the company, that the efficacy of the waters in the diseases for which they are recommended is proven by the constantly increasing popularity of the baths.

In 1852 were constructed the first twelve bathrooms; in 1860 the number was increased to thirty-six; and in 1880 a new establishment was constructed containing twenty-two bathrooms. In 1889 twenty bathrooms were added, and in 1893 the number was increased to a total of seventy-five rooms in the new establishment, besides a grand saloon and extra rooms for inhalations, massage, and the iodine-salt mud baths.

The diseases for which the waters of Salsomaggiore are especially indicated and which receive particular attention at the baths are scrofula, syphilis, arthritic diseases, periostitis, osteitis, and uterine troubles (treated with the salt-iodine baths and the Acqua Madre baths); diseases of the pulmonary passages, bronchitis, and all other troubles for which absorption of iodine is suggested (treated by inhalations); rheumatism and joint affections (treated with mud baths); diseases of women (treated by irrigations); and diseases of the nervous system, hysteria, chorea, neuritis, headache, sciatica, and insomnia (treated by the hydro-electric baths).

The rules and regulations governing these baths are as follows, stated in a condensed form:

The bather, before commencing any course of treatment, must be provided with a ticket of admission. This contains instructions and serves at the same time as a counter register for both the family physician and the patient. The physician is at the patient's disposal during the time arranged on the time-table. The patient must make known to the physician any treatment he is already undergoing, which, however, he can continue if compatible with the baths. The use of sponges is strictly prohibited. The bathrooms must be kept rigorously clean in accordance with the laws of hygiene. A stove having been introduced for the disinfection of linen, according to the modern system of Dr. Geneste-Herscher, of Paris, is kept in action for the benefit of the public. In short, all rules are made with especial regard to the isolation of the patients, the disinfection of the walls, floors, and all the appliances by the best known modern methods.

The baths are open for use according to the following time-table:

Salt-iodine baths, from 7 a. m. to 5 p. m. during May, September, and October, in both the old and new establishments.

Acqua Madre and mixed baths (the latter contain an increase of iodine and bromine for the benefit of those who require a stronger form of treatment), from 5 a. m. to 6 p. m. during June, July, and August, in the old and new establishments.

Inhalations with sterilized Acqua Madre from 9 a. m. to 11 p. m. in May, 3 a. m. to 4 p. m. in October, 8 a. m. to 11 p. m. in June, 3 a. m. to 5 p. m. in September, 7 a. m. to 11 p. m. in July, 3 a. m. to 6 p. m. in August. These are taken in the new establishment.

The shower baths, mud baths, hydro-electric baths, and massage are taken in the old establishment, according to requirements.

From 12 noon till 1.30 p. m. all the bathrooms are closed.

The consulting hours are from 7 to 11 a. m. and from 2 to 5 p. m. in both old and new establishments.

The prices of the various baths are as follows: Salt-iodine, 2.25 francs (43 cents); Acqua Madre, according to density, 3.25 and 4 francs (62 and 77 cents); mixed baths of iodine-bromine salt and Acqua Madre, 5.35 francs ($1.03). An extra charge of 1 franc (19.3 cents) is made for baths in private apartments. Two children of same sex, under 7 years of age, not suffering from any contagious illness, may use separate baths in the same apartment for half the usual fees. Children sharing the bathroom with an adult are charged half price.

Baths of Acqua Madre are allowed free of charge to those who have taken at least five baths of other kinds in the establishment under the direction of the medical authority.

The charges for the baths are made inclusive of linen. Two sheets and four towels are allowed each bather.

The inhalations are open to the public at the hours stated on the time-table. The treatment consists in inhaling Acqua Madre through an atomizer. The price of a ticket is 1 franc (19.3 cents).

A bottle containing 1 liter (1.0567 quarts) is sold at 50 centesimi (10 cents) for douches in female disorders, but the douche must be taken at the patient's apartments.

The shower baths, mud baths, massage, and the electro-therapy treatments vary in price, according to conditions, from 1 to 4 francs (19.3 to 77 cents).

The Acqua Madre and salts for baths and the salt-iodine-bromine waters for drinking are sold for transportation, delivered at risk of purchaser at the tramway station, at the following prices:

*Acqua Madre (for baths).*

| | Francs. |
|---|---|
| 1 bottle, exclusive of cost of packing | 0.80=$0.15 |
| 6 bottles, including cost of packing | 4.50= .86 |
| Tin of 24 kilograms, including cost of packing | 10.00= 1.93 |
| Box of 2 tins, including cost of packing | 20.00= 3.86 |

Before using, the above water must be diluted with pure water, according to the condition of the patient and the direction of the physician. The bath should always be taken warm.

*Acqua Madre (for inhalation).*

| | Francs. |
|---|---|
| 1 bottle, exclusive of packing | 1.20=$0.23 |
| Case of 6 bottles, with cost of packing | 7.00= 1.35 |
| Case of 12 bottles, with cost of packing | 14.00= 2.70 |

*Iodine-bromine-salt water (for drinking).*

| | |
|---|---|
| 1 bottle, exclusive of packing | 0.80= .15 |
| Case of 6 bottles, with cost of packing | 4.50= .86 |
| Case of 12 bottles, with cost of packing | 9.00= 1.72 |

The amount of iodine contained in this water is said to make it very efficacious in scrofula, syphilis, muscular and chronic rheumatism, and in uterine derangements. It is prescribed for adults in doses of not less than six tablespoonfuls three times a day, either alone or in water; and for children, according to their age and the judgment of the medical adviser.

The iodine-bromine salts for baths are sold in blocks of 1 kilogram (2.2046 pounds) at 1.50 francs (28 cents) each. This salt must be dissolved in hot water before using and afterwards poured into the bath.

The Acqua Madre for female disorders sells at the same price as the iodine-bromine-salt water for drinking. It should be used as a

douche undiluted and at a temperature of 100° or 122° F., according to the advice of the physician.

About 2 miles from the above Salsomaggiore springs are the well-known sulphur baths of Tabiano. These waters are taken for chronic cutaneous diseases, chronic rheumatism, gout, old diseases of the bladder, constipation, etc. There are also modern conveniences at this bathing establishment.

The season at the following baths lasts as given in table, with time stated in which beneficial results are shown or a cure effected. Except in special cases, only one bath a day is prescribed. The common price per bath varies from 60 centesimi (11 cents) to 1.50 lire (28 cents), sometimes from 2 to 3 lire (38 to 57 cents), and the most expensive from 3 to 5 lire (57 to 96 cents).

| Bath. | Season. | Cure. |
|---|---|---|
| Berbenno | June 20 to September 15 | 15 to 20 days. |
| Bormio | June 15 to August 30 | 20 to 30 days. |
| San Pellegrino | June 1 to August 31 | Do. |
| Tabiano | May 1 to September 30 | Average 15 days. |
| Trescore Balneario | June 1 to August 31 | 15 to 25 days. |

The average cure at Salsomaggiore (the open season has already been given) is twenty days.

Most of the mineral waters mentioned in this report have a very good local reputation, and a few have more than local fame; yet I doubt if even the best are known in the United States.

WM. JARVIS,
*Consul.*

MILAN, *March 15, 1900.*

## SICILY.

There is one mineral spring in this consular district which has a favorable local reputation; it is called "Acqua Minerale di Paternò," and is located at and owned by the city of Paternò. There is no trade in this water, it being free to anyone that cares to use it.

Some years ago, a firm in Catania undertook to bottle it and place it on the market, but could not effect enough sales to make it profitable.

I give herewith an analysis of the water by Prof. Orazio Silvestri, of the University of Catania:

| | Grams. |
|---|---|
| Carbonic acid (free) | 2.078 |
| Oxygen | 0.0012 |
| Azote | 0.0031 |

| | Grams. |
|---|---|
| Bicarbonate of soda | 0.8933 |
| Bicarbonate of potash | 0.023 |
| Bicarbonate of magnesia | 0.524 |
| Bicarbonate of lime | 0.4805 |
| Strontium | Trace. |
| Carbonate of iron | 0.0436 |
| Carbonate of magnesia | Trace. |
| Sulphate of sodium | 0.0585 |
| Chlorate of sodium | 0.1158 |
| Phosphate of sodium | 0.0063 |
| Salicylic acid | 0.117 |
| Organic matter | Trace. |

The capacity of the spring is estimated at 160,000 gallons in twenty-four hours.

ALEXANDER HEINGARTNER,

CATANIA, *April 14, 1900.* *Consul.*

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### VENICE.

I have instituted inquiries in regard to the mineral-spring-water industry in this consular district, but the result of my investigation has not been such as to warrant a formal report on the subject. There exist in this district two inconsiderable springs—in the communes of Recoaro and Abana. These springs are virtually unknown, even in the region of Veneto. They are said to possess little medicinal value and are exploited in a small way by their owners merely as a money-making venture. Export is unknown.

H. ABERT JOHNSON,

VENICE, *April 10, 1900.* *Consul.*

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## SPAIN.

### BARCELONA.

The mineral-spring-water trade in Spain has never yet been developed to an extent commensurate with the number of springs of varied medicinal properties known to exist in different parts of the country.

In the province of Catalonia there are thirty-one, classified as follows: Eight sulphurous, eight chlorated, nine bicarbonated, two soda sulphates, and four ferruginous.

### PUDA DE MONTSERRAT.

Of the first group, the most important is that known by the name of the "Puda de Montserrat," situated at the foot of the celebrated Mountain of Montserrat and at an elevation of 390 feet above sea level. These springs are said to be among the most sulphurous in existence. The analysis of the water is as follows:

| | Cubic centimeters. |
|---|---|
| Gases: | |
| Nitrogen | 21.35 |
| Carbonic acid | 122.98 |
| Salts or fixed principles: | |
| Sulphide of sodium | 0.043 |
| Silicate of sodium | 0.041 |
| Chloride of magnesium | 0.052 |
| Chloride of lime | 0.346 |
| Chloride of sodium | 1.023 |
| Sulphate of sodium | 0.13 |
| Sulphate of lime | 0.435 |
| Bicarbonate of lime | 0.21 |
| Bicarbonate of magnesium | 0.035 |
| Alumina | 0.011 |
| Ferric oxide | 0.004 |
| Nitrogenous organic matter | 0.026 |
| Bromides, iodides, and boracic acid | Indications. |

From the foregoing, it will be seen that the chief component parts of the water of the Puda are sulphide of sodium and chlorides of lime.

The waters are taken externally as well as internally, and are found very beneficial in nearly all cases of skin disease, and also for rheumatism and gout when these are accompanied by certain cutaneous complaints.

### CALDAS DE MONTBUY.

In the second group, the most important waters are those of Caldas de Montbuy. These chloride-of-sodium springs are the oldest, the best known, and the most frequented in Spain. Their temperature varies from 36° to 70° centigrade. The official season is from May 1 to July 15 and from September 15 to October 15, although by royal decree of May 21, 1872, they are allowed to remain open throughout the year.

Caldas de Montbuy lies about 16 miles from Barcelona and is annually visited by thousands of invalids suffering from rheumatism and skin diseases.

Accommodation is provided at numerous hotels and inns, the best appointed being the Establecimiento de Rius. Here the remains of old Roman baths may still be seen, proving the length of

time that the healing properties of these waters have been known. In the sixteenth century, the greater part of the establishment belonged to the ancestors of the Duke of Almenara Alta, from whom it passed to the present proprietors, who have owned it now for eight generations. Most of the baths are of marble, and some of the bedrooms have direct communication with the baths below by means of elevators, so that patients who are completely paralyzed may be treated with every comfort to themselves. High-pressure shower baths and vapor baths may also be had.

The hotel accommodation is better than can be found at most spas in Spain. A well-kept park is reserved for the visitors, and amusements in the shape of billiards, music, and gymnastics are provided.

There are also two hospitals at Caldas—one military and the other civil.

The analysis of the water is as follows:

| Volatile dissolved gases (reduced to 0° and 760 millimeters): | Grams. |
|---|---|
| Nitrogen (9.082 cubic centimeters) | 0.01141 |
| Oxygen (2.155 cubic centimeters) | 0.00314 |
| Free carbonic acid (0.182 cubic centimeter) | 0.00037 |
| Total (11.419 cubic centimeters) | 0.01492 |
| Fixed principles: | |
| Bicarbonate of potash | 0.00238 |
| Bicarbonate of sodium | 0.01952 |
| Bicarbonate of lime | 0.01481 |
| Bicarbonate of magnesium | 0.00166 |
| Bicarbonate of iron | 0.00127 |
| Sulphate of potash | 0.00128 |
| Sulphate of lime | 0.07967 |
| Sulphate of magnesium | 0.00384 |
| Chloride of sodium | 0.91386 |
| Chloride of lime | 0.00749 |
| Aluminum oxide | 0.00475 |
| Silicic acid | 0.08925 |
| Lithic oxide and phosphoric acid | Indication. |
| Nitrogenous organic matter | 0.094 |
| Total | 1.23828 |
| Saline residuum | 1.23066 |

LA GARRIGA.

Another well-known spa belonging to the second group is La Garriga. There are several thermal chloride-of-sodium springs in this village, situated in the province of Barcelona at an elevation of about 700 feet above sea level, in a pleasant valley surrounded by

hills. The official season is from May 15 to July 15 and from August 20 to October 20.

A large hydropathic establishment, under the management of a doctor, is well patronized during the season. An analysis of the water, made in 1866, showed that each liter contains—

| | Cubic centimeters. |
|---|---|
| Nitrogen | 12. 5 |
| Oxygen | 4. 5 |
| | Grams. |
| Chloride of sodium | 0. 1031 |
| Chloride of calcium | 0. 0072 |
| Bicarbonate of sodium | 0. 0137 |
| Bicarbonate of calcium magnesium | 0. 0101 |
| Bicarbonate of iron | 0. 008 |
| Silicate of sodium | 0. 0602 |
| Alumina | 0. 009 |
| Organic matter | 0. 096 |

The temperature of the springs varies between 44° and 60° centigrade (111° and 140° F.).

### CALDAS DE MALAVELLA.

Caldas de Malavella is situated about 60 miles to the north of Barcelona. Several warm springs are found here, the water having a varying temperature of from 49°, 58°, and 60° centigrade. The official season is from May 15 to October 15. The analysis of the water gives—

| | Cubic centimeters. |
|---|---|
| Carbonic acid | 5. 8 |
| Chloride of lime | 0. 29 |
| Chloride of magnesium | 0. 85 |
| Chloride of sodium | 0. 074 |
| Sulphate of lime | 0. 069 |
| Sulphate of magnesium | 0. 048 |
| Sulphate of iron | 0. 023 |
| Silica | Indications. |
| Organic matter | 0. 045 |

The waters are prescribed in cases of rheumatism, scrofula, paralysis, and for healing wounds. Two small hotels cater for the visitors who frequent this spa.

### VICHY CATALAN.

In this same village is another spring that goes by the name of Vichy Catalan. Up to the present, this water has mostly been bottled and sold in that way in competition with the French Vichy. Considerable care is taken in the bottling process, and a large sale

has been secured in Spain. Its chemical properties are given as follows:

| | |
|---|---|
| Volatile principles: | |
| Nitrogen | 0.8 |
| Free carbonic acid | 0.32216 |
| Fixed principles: | |
| Sulphate of potash | 0.02641 |
| Sulphate of sodium | 0.02153 |
| Sulphate of barium | 0.00098 |
| Sulphate of strontium | 0.0185 |
| Sulphate of lime | 0.00492 |
| Chloride of potash | 0.32285 |
| Chloride of sodium | 0.25315 |
| Bicarbonate of potash | 0.05183 |
| Bicarbonate of sodium | 2.95 |
| Carbonate of lithium | 0.00025 |
| Carbonate of lime | 0.12555 |
| Carbonate of magnesium | 0.03225 |
| Carbonate of iron | 0.00687 |
| Carbonate of manganese | 0.00027 |
| Phosphate of alumina | 0.0006 |
| Phosphate of lime | 0.00201 |
| Silicic acid | 0.0732 |
| Boric acid, etc | 0.05609 |
| Total found in 1 liter of water* | 5.07452 |

CARDO.

These waters are said to be bicarbonated, calcic, and arsenical. They flow from the heights of San Hilario de Cardo, in the province of Tarragona.

The establishment is situated at 1,600 meters (5,280 feet) above sea level. The official season is from June 15 to September 15. There are three springs—La Columna, San Roque, and San José. Those used are San Roque and La Columna, distant from the establishment about 1 mile and 500 yards, respectively. The analysis of these waters is as follows:

| Constituents. | Columna. | | San Roque. | |
|---|---|---|---|---|
| Dissolved gases: | *Cubic cent.* | *Grams.* | *Cubic cent.* | *Grams.* |
| Nitrogen | 12.163 | 0.01527 | 10.046 | 0.01261 |
| Oxygen | 4.683 | 0.00669 | 4.873 | 0.00697 |
| Free carbonic acid | 0.869 | 0.00168 | 0.713 | 0.00141 |
| Total | 17.715 | 0.02364 | 15.632 | 0.02099 |
| Fixed substances: | | | | |
| Bicarbonate of potash | | 0.00099 | | 0.00118 |
| Bicarbonate of sodium | | 0.00231 | | 0.00487 |
| Bicarbonate of lime | | 0.12953 | | 0.12571 |

*Note by the Bureau of Foreign Commerce.—From the manner in which this table was composed it could not be made clear whether the totals were grams or grains.

| Constituents. | Columna. | | San Roque. | |
|---|---|---|---|---|
| Fixed substances—Continued. | *Cubic cent.* | *Grams.* | *Cubic cent.* | *Grams.* |
| Bicarbonate of strontium | Indications. | | | Indications. |
| Bicarbonate of magnesium | | 0.01758 | | 0.01411 |
| Bicarbonate of iron | | 0.00407 | | 0.00378 |
| Bicarbonate of manganese | | Indications. | | Indications. |
| Sulphate of lime | | 0.09856 | | 0.06462 |
| Sulphate of manganese | | 0.02767 | | 0.02471 |
| Chloride of sodium | | 0.00388 | | 0.00462 |
| Chloride of lime | | 0.00312 | | 0.00097 |
| Chloride of magnesium | | 0.00503 | | 0.00428 |
| Silicate of sodium | | 0.00433 | | 0.00189 |
| Silicate of magnesium | | 0.00184 | | 0.00703 |
| Arsenate of lime | | 0.00041 | | 0.00038 |
| Iodide of sodium | | 0.00031 | | 0.00029 |
| Bromide of magnesium | | 0.00013 | | 0.00014 |
| Oxide of lithium | | Indications. | | Indications. |
| Oxide of aluminum | | 0.01167 | | 0.01272 |
| Phosphoric acid | | 0.00125 | | 0.00145 |
| Organic matter | | 0.03836 | | 0.03772 |
| Total | | 0.35104 | | 0.31407 |

## SPRINGS OF SAN HILARIO (SACALM).

The principal springs of the hydro-mineral station of San Hilario (Sacalm) are three in number. They rise from the crevices in the rocks on the right side of the Riera (stream) of Monsoli, at a little distance from one another and about 3 miles from the village of San Hilario. This village stands at an elevation of 2,600 feet above the level of the sea and is connected with the railway from Barcelona to France by a good road, 20 miles from the springs to the station of Hostalrich. The name of the district is Guilleries. The ground is very mountainous, and its sloped and rugged hills—about 3,000 feet in height—are covered with chestnut, beech, evergreen oak, and ash trees. The mean temperature is 18° to 19° centigrade (64° to 68° F.) during the summer.

Tradition relates that in the middle of last century some shepherds noticed that when the oxen, through the heat of the summer and excessive work, suffered from irritation in the kidneys, and in consequence urined blood, they went to drink the water which issued from some rocks concealed between the shrubs on the right side of the Riera of Monsoli and that a few days afterwards they were cured.

This fact, verified several times by the shepherds, coupled with the fresh taste of the water, attracted the attention of the doctor of the village, who began to try it on himself and some of his patients, with such a happy result that a few years afterwards, in 1775, he was able to affirm by experience that the fine, small sands of the kidneys, the vexical calculus, the calculus in the liver, and other

dyscrasic infirmities, as well as certain stomachic disorders, were promptly and radically cured by the use of these waters.

Their fame went as far as the royal palace, notwithstanding the difficulty of communication in those days. In the latter years of the reign of Ferdinand VII, this sovereign, by the advice of his doctors, tried them with the best results for his own complaints and ordered them to be sent in bottles to Madrid.

In December, 1879, when these waters were declared of public utility by royal decree, a new road was made from Hostalrich to the foot of the springs, where the present establishment was erected, and from that moment this watering place became one of the most famous in Spain. From 4,000 to 5,000 persons visit it annually.

Of the three fountains declared of public utility by the said royal decree, the oldest and the one which has given fame to the place is called Font Picant, or pricking fountain. The other two were discovered in 1877 and 1878 by the present proprietor, and, although the water is of a similar nature, one can notice some variation in the chemical properties.

These waters have been awarded prizes at the exhibitions of Paris, Nice, Frankfort, Madrid, Barcelona—in fact, at all to which they have been sent. They were, however, little known abroad until a few years ago, because the proprietor never thought of pushing their sale.

As these waters have never been sent to the United States, the proprietor would be glad to make an arrangement with some important firm in order to introduce them, and for this purpose he is disposed to sell them at the rate of 75 centimes per liter bottle, or, say, at about 11 cents per 2 American pints, delivered at the port of Barcelona.

They are transparent and colorless, slightly pricking to the tongue, and styptic. Their density is 1.0013; their temperature, winter and summer, is about 12° centigrade.

Fountain No. 1 gives 4,000 liters per diem; No. 3 gives 2,000, and No. 2, about 1,000; so that some 2,000,000 bottles could be exported every year. It is said that these waters contain more carbonic gas than any other water, and therefore can be transported to any distance without any kind of preparation or manipulation. They have been successfully exported to the Philippines, Spanish Antilles, and South American republics, although thus far only in small quantities.

The analysis is given as follows:

| In every liter, this water contains— | Fountain No. 1 (Font Picant). | Fountain No. 2. | Fountain No. 3. |
|---|---|---|---|
| | *Grains.* | *Grains.* | *Grams.* |
| Gases (free carbonic acid) | 2.31 | 1.8045 | 1.794 |
| Fixed substances: | | | |
| Carbonate of sodium | 0.2412 | 0.1972 | 0.1853 |
| Carbonate of iron | 0.0177 | 0.0146 | 0.0172 |
| Carbonate of lime | 0.597 | 0.405 | 0.486 |
| Carbonate of magnesium | 0.0071 | 0.0252 | 0.0267 |
| Carbonate of lithium | 0.00054 | 0.00034 | 0.00048 |
| Alumina | 0.0059 | 0.0051 | 0.006 |
| Phosphoric acid | 0.0083 | 0.0071 | 0.0084 |
| Silica | 0.0361 | 0.0401 | 0.0432 |
| Sulphate of lime | 0.0073 | 0.0089 | 0.0125 |
| Chloride of lime | 0.0016 | 0.0091 | 0.0032 |
| Chloride of magnesium | 0.0078 | 0.0079 | 0.0256 |
| Manganese | Indications. | Indications. | Indications. |

The professors of the medical faculty of the University of Barcelona declare that, according to their own experience, the bicarbonate-calcic-ferruginous waters of San Hilario (Sacalm) cause positive cures in the following diseases:

*Affections of the digestive tube.*—Dyspepsias in general, convulsive dyspepsia with vomit, gastralgia, gastro-intestinal-chronic catarrh.

*Hypatic affections.*—Litiasis epatica, simple intemperate eating.

*Affections of the urinary apparatus.*—Litiasis of all kinds, urica in particular; uexical chronic catarrh.

*Affections in the nervous apparatus.*—Cloro-anæmia; splenic lucemia, particularly when consecutive to intermittent fevers.

## RUBINAT.

This natural purgative mineral water is well known, not only in Spain, but also throughout Europe, and large shipments have been made from time to time to the United States.

The analysis of a liter of water, made by Dr. José Canudas y Salada, official chemist of Barcelona, is as follows:

| | Grams. |
|---|---|
| Sulphate of soda | 93.23 |
| Sulphate of potash | 0.228 |
| Sulphate of magnesia | 3.172 |
| Sulphate of lime | 18.87 |
| Chloride of sodium | 1.99 |
| Silica, alumina, ferric oxide | 0.036 |
| Loss | 0.017 |
| Total crystallized saline contents | 100.56 |

The remarkable proportion of sulphates shown by the above figures will be noticed. The water suffers no manipulation whatever and is bottled at once.

The sale is increasing yearly. In 1898, 150,000 pint bottles were shipped to the United States, while in 1899 the number was 185,000 bottles.

It is claimed for this water that it is beneficial in cases of difficult digestion, chronic indigestion, costiveness, jaundice, affections of the liver and spleen, congestion of the brain, apoplectic attacks, diseases of the uterus, all forms of tetter and cutaneous diseases, excessive corpulence, and hemorrhoids, and in the treatment of all gouty disorders and rheumatism.

### ARGENTONA.

Of ferruginous springs, there are two in the province of Catalonia, one situated in the village of Argentona, distant some 17 miles from Barcelona. The analysis of the water is:

| Gases: | Grams. |
|---|---|
| Nitrogen (16.308 cubic centimeters) | 0.02048 |
| Oxygen (5.408 cubic centimeters) | 0.00773 |
| Free carbonic acid (535.389 cubic centimeters) | 1.05868 |
| Free carbonic acid in semicombination (46.456 cubic centimeters) | 0.09186 |
| Total (603.561 cubic centimeters) | 1.17875 |
| **Fixed substances:** | |
| Carbonate of potash | 0.00455 |
| Carbonate of sodium | 0.01745 |
| Carbonate of lime | 0.17836 |
| Carbonate of magnesium | 0.00693 |
| Carbonate of iron | 0.00281 |
| Sulphate of potash | 0.00235 |
| Sulphate of sodium | 0.05591 |
| Sulphate of lime | 0.00306 |
| Sulphate of magnesium | 0.03173 |
| Alumina | 0.00285 |
| Silica | 0.03875 |
| Phosphoric acid | Indications. |
| Nitrogenous organic matter | 0.0561 |
| Total | 0.40464 |

These bicarbonated ferruginous springs are drunk in cases of dyspepsia and other internal derangements.

### ESPLUGA DE FRANCOLI.

Espluga de Francoli, near Tarragona, boasts a very ancient iron spring, and the locality is much resorted to during the summer months by families in search of a cool and healthy spot. The following analysis is given of the water:

| | Grams. |
|---|---|
| Bicarbonate of iron | 0.42 |
| Bicarbonate of lime | 0.131 |
| Bicarbonate of magnesium | 0.171 |

| | Grams. |
|---|---|
| Sulphate of potash | 0.112 |
| Chloride of sodium | 0.015 |
| Silicate of sodium | 0.005 |
| Phosphate of aluminum | 0.002 |
| Total | 0.856 |

Persons who have taken the baths and waters in Spain and in other countries inform me that many of the springs are so much more beneficial than those in Germany and France that, were it not for the indifferent railway and hotel facilities and accommodations, the Spanish springs would undoubtedly be better patronized.

JULIUS G. LAY,
*Consul-General.*

BARCELONA, *July 9, 1900.*

## CARTHAGENA.

The principal mineral springs in this district are those situated at Archena, Fortuna, Alhama, and Mula—all in this province of Murcia. I will deal with them consecutively.

### ARCHENA.

This place is situated about 58 miles from here, near the main railway line running between Carthagena and Madrid.

There are four springs. One yields 354,960 liters in twenty-four hours; the other three are said not to have been measured.

The temperature of the water at the spring is 132° F. Its density is 1.002334.

One liter of water gives off the following gases by ebullition:

| | Cubic centimeters. |
|---|---|
| Sulphurous acid | 6.97 |
| Carbonic acid | 46.12 |
| Nitrogen | 19.04 |
| Total | 72.13 |

One liter of water contains in solution as follows:

| | Grams. |
|---|---|
| Free carbonic acid | 0.027573 |
| Free sulphurous acid | 0.015088 |
| Nitrogen | 0.0239 |
| Bicarbonate of lime | 0.283032 |
| Bicarbonate of magnesia | 0.00048 |
| Bicarbonate of iron | 0.002854 |
| Bicarbonate of manganese | 0.002971 |
| Bicarbonate of soda | 0.057085 |
| Sulphate of lime | 0.49165 |
| Sulphate of magnesia | 0.047405 |

| | Grams. |
|---|---|
| Sulphate of potash | 0.092657 |
| Sulphate of soda | 0.260325 |
| Chloride of lime | 0.018672 |
| Chloride of magnesia | 0.063214 |
| Chloride of soda | 0.076017 |
| Chloride of lithium | 0.000249 |
| Iodide of magnesia | 0.003975 |
| Silicate of soda | 0.007823 |
| Phosphate of alumina | 0.006254 |
| Free silica | 0.02615 |
| Organic matter | 0.02289 |

The above is the official analysis; but popularly these baths are known as sulphur baths.

They are open officially from the 1st of April to the 30th of June, and again from the 1st of September to the 30th of November; but in practice they are never closed.

These waters are undoubtedly very valuable for curing skin diseases, rheumatism, and syphilis; possibly other things. They are visited by about ten thousand persons each year, coming from all parts of Spain and many from abroad.

There are several hotels, a telegraph office and post-office, and such other conveniences as are usual in Spanish bathing places; but they can not be compared with any first-class American, German, or French spa, and there is not much of what an American would call comfort.

A little water is bottled and sent to different parts of Spain; it is charged for at about 12 cents gold per ordinary claret bottle at the baths. The quantity sold must be a mere trifle, and none is exported to other countries.

### FORTUNA.

This place is about 10 miles from the railway station of Archena and 17 miles from the city of Murcia; it is connected with both places by a service of omnibuses and other vehicles.

The supply of water is described as "abundant" and its temperature at the springs is about 118° F. Its density is 1.003205.

One liter of water yields by boiling—

| | Cubic centimeters. |
|---|---|
| Nitrogen | 11.957 |
| Carbonic acid | 9.407 |

One liter of the water contains in solution:

| | Grams. |
|---|---|
| Carbonic acid | 0.02101 |
| Nitrogen | 0.01505 |
| Chloride of soda | 2.57656 |
| Chloride of magnesia | 0.125 |

| | Grams. |
|---|---|
| Bicarbonate of soda | 0.09201 |
| Bicarbonate of lime | 0.02016 |
| Sulphate of lime | 0.84864 |
| Sulphate of magnesia | 0.10545 |
| Silica | 0.0514 |
| Alumina | 0.0096 |

These baths are open from the 1st of April to the 30th of June, and from the 1st of September until the 15th of November. I believe that during the remaining months, there is a limited service for the benefit of patients who can not wait.

Several thousand people bathe here and drink the water every year; and those suffering from rheumatism, bronchial or stomach disorders are said to obtain decided relief.

With regard to hotels, etc., this place is much on a level with Archena.

I have never heard of the water being bottled or sent anywhere.

### ALHAMA.

This is situated on the railroad between Murcia and Lorca, and is about 25 miles distant from Carthagena as the crow flies.

I applied to the manager of the baths for data respecting the water and did not receive any reply; hence my information is limited.

The temperature of the water at the spring is about 112° F. It is said to be alkaline, but I have no analysis. The place is open, I believe, all the year and is visited by a good many people suffering from rheumatism, scrofula, and herpes.

The bathing establishment and hotel accommodation are on a very much smaller scale than at either Archena or Fortuna.

No water is sent away.

### MULA.

These baths are located about 12 miles from Alcantarilla, which is the nearest railway station.

There are several springs, yielding a plentiful supply of hot or warm water, of which I have no analysis.

The baths have a good local reputation and are patronized by a large number of people from this section of Spain, who are in the habit of taking baths every year in the spring or fall, but who do not require anything so strong as the waters of Archena or Fortuna.

The hotels are rather primitive.

The water is not shipped anywhere.

JOSEPH BOWRON,

CARTHAGENA, *March 10, 1900.* *Consul.*

## SWEDEN.

The Kingdom of Sweden does not export mineral water in any quantity.

The mineral springs and bathing resorts of the country can be divided into five groups. There are twenty-two mineral springs, twenty-three salt-sea bathing resorts, one mineral-clay bathing sanatorium, and some ten to fifteen cold-water cures and health resorts.

The most prominent mineral springs are Rouneby, Porla, Ramlösa, and Medevi.

Rouneby lies in the southern part of Sweden, in the county of Bleking. This province is called the "Garden of Sweden." About the spring there has been laid out a park of some 225 acres. The spring has been known for its curative powers since 1705. The water has no odor, but has a faintly acid reaction. I am able to give the following analysis:

| | Grains per gallon. |
|---|---|
| Total solid matter | 138.3 |
| Ammonia ($HH_3$) | 0.662 |
| Oxygen required to oxidize organic matter | 0.006 |
| Organic carbon | 0.064 |
| Lime (CaO) | 8.51 |
| Magnesia | 4.467 |
| Sulphuric acid | 63.87 |
| Nitric acid | None. |
| Chlorine | 3.672 |
| Bromine | None. |
| Iodine | None. |
| Manganese | Trace. |
| Iron, estimated as oxide of iron | 40.7 |
| Alkalis, not ammonia, estimated as sulphates | 5.64 |
| Silica, etc | 5.1 |

Hardness before boiling, 95 per cent; hardness after boiling, 77 per cent.

From the above, it is evident that the water is of great organic purity and contains an enormous quantity of iron salts in solution.

The mineral spring of Porla lies in the middle of the Kingdom, between Stockholm and Gothenburg. The water is bottled and distributed throughout the country and is on sale at drug stores. The spring received its name from the bubbling gas that is contained in the water in the proportion of 6 to 1. The spring is some 3 feet deep, with a fine clear bottom of sand. It has been walled in. The capacity is about 52,560 quarts every twenty-four hours. The water is clear, and is more used for drinking purposes than all the other mineral waters in Sweden.

Ramlösa lies in the southern part of Sweden. Its waters were used for curative effects as far back as 1676 by the soldiers of Carl XI, when they were encamped in the neighborhood.

The Medevi mineral spring is situated in the province of Linköping.

EDWARD D. WINSLOW,
*Consul-General.*

STOCKHOLM, *April 10, 1900.*

## NORWAY.

The principal mineral springs in the district are located at the following places: Sandefjord, Grefsen, Vestfossen, Larvik, Modum, and Eidsvold.

All are provided with comfortable hotels and sanatoriums, with first-class medical attendance.

The spas at Sandefjord and Larvik are the largest and most popular, and they are much frequented by foreigners.

At Sandefjord, three distinct waters are obtained:

(1) From a sulphur spring holding in 1,000 cubic centimeters of water about 36 cubic centimeters of hydro-sulphuric acid and 496 cubic centimeters of carbonic acid.

(2) From a saline spring strongly impregnated with chlorine of sodium (chlornatrium).

(3) From a mineral spring holding in 10,000 parts of water 12.9 parts of oxide and protoxide of iron.

At Sandefjord and at some of the other spas, they also make use of a sulphur holding mud, which is taken from the bottom of the bay every day during the season and is said to have great curative effect, especially in cases of rheumatism. It is used as an admixture in warm sulphur baths, as poultices, and as an ointment in connection with massage.

The treatment at the Norwegian baths is largely the same as is employed in Germany.

After careful inquiry, I learn that no natural mineral waters are exported from Norway, and I am informed by a medical man of this city who is well posted on the subject that the only water available for export would be that flowing from the sulphur springs. He considers the one at Vestfossen the best.

HENRY BORDEWICH,
*Consul.*

CHRISTIANIA, *March 19, 1900.*

# SWITZERLAND.

## AARAU.

There are many mineral springs in this consular district. Among those worthy of special notice are Baden, Schinznach, and Birmenstorf.

### SCHINZNACH.

Schinznach is situated in the Canton of Aargau, about twelve hours from Paris, on the bank of the Aar, at the foot of the Wuelpelsberg.

Over a century ago, the spring came into prominence through a description sent to the Royal Society of Medicine in Paris by Dr. Herrenschwand, the physician and privy councilor to the King of Poland. In 1670, owing to a great overflow of the Aar, the spring entirely disappeared and was not found again until 1692. It was then discovered in a small island which had been formed in the river. The river was subsequently diverted, and the spring was protected by means of dikes against any future overflow. It formerly belonged to an individual, but is now the property of a company, and the management (except that of the hospital for the poor, which is under the supervision of the cantonal authorities) is intrusted to a director. The grounds are well laid out, and fine carriage roads and walks have been built through the forests of beech trees which surround the establishment.

The hotel is possibly one of the finest of the sort on the Continent and is fitted up with all modern improvements. During the season, which lasts from May 15 to October 1, the establishment is generally full. It is patronized principally by French people, but many Americans and English also visit it.

A little pamphlet published by Dr. de Tymonski, the resident physician at Schinznach, says, in reference to the efficacy of the waters:

> It is an incontestable fact that baths of natural sulphur waters cure certain skin diseases; also, that sulphureted hydrogen gas exercises a special and advantageous effect on the peripheral nerves. As to the theory which attributes to sulphur itself a specific action in the destruction of red blood corpuscles, this has been so much criticized and discussed that I will not speak of it here, and the only real thing to be proved is the clinical effect and the numerous cures effected by the influence of sulphureted hydrogen gas.
>
> At Schinznach, the action of the sulphureted hydrogen gas has been watched for some time and all its details thoroughly examined and analyzed. The inhalation and spray rooms are of the best construction and contain all the latest improvements. Not only simple pharyngitis and laryngitis are successfully treated at

Schinznach by inhalation, but also paralysis of the nerves of the larynx, chronic bronchitis, and even the earlier stages of tuberculosis, in which, according to the latest experiments by Professor Cantani, sulphureted hydrogen gas possesses a really specific action.

Dr. de Tymonski and many other eminent authorities claim that the waters are particularly good for general or local eczema, acne, psoriasis, and pityriasis, and numerous scrofulous maladies, enlargement of the glands, diseases of the periosteum, the bones, etc., and also articular rheumatism and chronic muscular rheumatism. Dr. de Tymonski further says that on several occasions he has seen remarkable effects in syphilitic affections, particularly when the patient has been first treated by mercury; not infrequently it is a means of throwing off the mercurialism and its consequences, often considered as the continuation of the primitive malady. Cases of primary syphilis are not suited for treatment at Schinznach, and it is advised that anæmic and chlorotic patients weakened by cachexia should not be sent there, as the waters are too strong for this class of maladies.

The waters of the spring have a reputation throughout Europe, principally for their curative powers in affections of the skin, and the establishment is generally full of such patients.

The chemical analysis of 1 liter of the water is as follows:

| Gaseous matters: | Cubic centimeters. |
|---|---|
| Sulphureted hydrogen gas | 37. 8 |
| Carbonic-acid gas | 90. 8 |
| **Solid matters:** | **Grains.** |
| Carbonate of lime | 3. 86 |
| Carbonate of magnesia | 1. 851 |
| Sesquioxide of iron | 0. 77 |
| Silica | 0. 169 |
| Sulphate of lime | 16. 834 |
| Alumina | 0. 154 |
| Chloride of sodium | 9. 026 |
| Chloride of potassium | 1. 327 |
| Sulphuret of calcium | 0. 123 |
| Total | 33. 421 |

Very little of the water is exported, and none whatever, as far as consular records show, to the United States. It is bottled to a small extent for the use of patients who have undergone the cure. As a remedy outside of the establishment it is not recommended, and it seems to be efficacious only in connection with the baths and other treatment at the establishment.

### BADEN.

With a population of about 5,000, this place is one of the principal towns in the Canton of Aargau. The efficacy of its thermal waters has been known for ages, and they were much visited, according to several authorities, even in Roman times. It is frequented at present by people of all nationalities.

The waters belong to the earthy saline, sulphurous class and contain a considerable amount of gas, nitrogen, and scanthoxide. The chief ingredients are: Sulphuric soda and sulphuric kali, chloride of lime, chloride of natrium, chloride of lithium, bicarbonate of magnesia, and traces of bromine and iodine. The waters are recommended for gout and rheumatism (after the inflammatory period), neuralgia, paralysis; the after effects of metallic poisoning from arsenic, lead, mercury, and iodine; for chronic catarrhs of the throat, stomach, bladder, or the respiratory organs; for diseases of the uterine system, contraction and stiffness of the muscles, and are of service in reviving the vital powers.

The waters are not bottled, and, from an export point of view, have no value.

### BIRMENSTORF.

Commercially speaking, the waters of Birmenstorf are the most important in this consular district. The little agricultural village of Birmenstorf, from which the spring takes its name, has about 1,000 inhabitants and is situated at the confluence of the Aar, Limmat, and Reuss.

About a mile above the village, on the southeast side of the mountain, are found the openings of the shafts which descend to the gypsum mines. These mines have been worked for eighty years. The shafts, of which there are seven in number, are between 50 and 100 meters in depth and are connected, with one exception, at different elevations by galleries 30 to 123 meters in length. By chance it was discovered in 1842 that these gypsum rocks could be utilized in the preparation of magnesian water. Basins with a capacity of 150 hectoliters were constructed to catch the water, and, in order to maintain the same density in all the basins, tests are made from time to time; and when the water in each reaches the required density, it is drawn off into large demijohns, which are then well corked and taken to the works. A new test is then made and the water put into bottles.

The water is purgative and has the same medicinal qualities as Hunyadi Janos, which is so well known in the United States. It is claimed that when well corked it will preserve its efficacy for years. While it took the gold medal at the Chicago exposition in 1893, it

does not seem to be known in the United States; and while some of it may find its way there, this does not appear on record at this office. It is on sale by all chemists throughout Switzerland and Europe, and the retail cost is 15 cents a bottle. Its sale has increased from 40,000 bottles in 1864 to about 200,000 bottles at the present time. The capacity of the spring is over 1,000,000 bottles per annum.

It is the property of Messrs. Voegeli & Wyss, at Zurich, to whom all communications relating thereto should be addressed.

### LUCIUSQUELLE.

The Luciusquelle Spring, of Tarasp, is situated at the extreme east of Switzerland in the Engadine, on the Austrian frontier.

The first authentic history of the spring and its curative properties dates back as far as the sixteenth century; but up to thirty years ago, it was almost inaccessible for wheeled carriages, and the journey had to be made on foot. Of late years, however, great improvements have been made in this respect. At the present time, Landeck, in the Tyrol, on the Arlberg Railway, is the nearest station to the hotel connected with the spring, and the intervening distance is made by diligence or private carriages over good roads in eight or nine hours.

The springs are under the management of a company, and the address is "Exportverwaltung Kurhaus Tarasp, Engadine, Switzerland."

The company has agents in all parts of the world, those for the United States being Weber & Co., 139–141 Third avenue, New York.

A description of the spring, with analysis of the water and its efficacy, a comparison with other well-known springs, and directions for use has been sent to me by the Tarasp company, and is as follows:

More than fifty years ago, the Luciusquelle at Tarasp was proclaimed by many celebrated physicians, among them Schönlein, Osann, Vetter, and later on Lersch, Lebert, and Braun, to be one of the most efficacious of mineral waters.

Its more important medicinal constituents are bicarbonate of soda, chloride of sodium, sulphate of soda, and the alkaline earths. The spring therefore belongs to the class of alkali-saline mineral waters and, more definitely, to the cold Glauber's salt springs; though in carbonic acid and solid constituents it exceeds all other European springs of the same class.

*Analysis of the Luciusquelle in 16 ounces (7,680 grains), the carbonates calculated as bicarbonates.*

| | |
|---|---|
| Sulphate of soda | 16.131 |
| Sulphate of potash | 2.916 |
| Borate of soda | 1.312 |
| Nitrate of soda | 0.006 |
| Chloride of sodium | 28.216 |

| | |
|---|---|
| Chloride of lithium | 0.022 |
| Bromide of sodium | 0.173 |
| Iodide of sodium | 0.007 |
| Bicarbonate of soda | 37.426 |
| Bicarbonate of ammonium | 0.507 |
| Bicarbonate of lime | 18.8 |
| Bicarbonate of strontia | 0.005 |
| Bicarbonate of magnesia | 7.524 |
| Bicarbonate of protoxide of iron | 0.165 |
| Silica, phosphoric acid, alumina, barium, rubidium, cæsium, thallium, organic matter | Trace. |
| Total amount of fixed matters | 113.210 |

Free carbonic acid gas, 33.92 cubic inches.

The exceptionally high therapeutical value for medicinal purposes is clearly seen upon comparing its proportion of active constituents with that of other celebrated alkaline waters by the aid of the following table:

| In 16 ounces=7,680 grains (carbonates). | Total solid matters. | Carbonic-acid gas. | Carbonate of soda. | Sulphate of soda and potash. | Chloride of sodium. |
|---|---|---|---|---|---|
| | | *Cubic in.* | | | |
| Tarasp (Luciusquelle) | 93.8 | 76.2 | 26.4 | 19 | 28.2 |
| Carlsbad (Sprudel) | 42.4 | 12.6 | 10 | 19.9 | 8 |
| Marienbad (Ferdinandsbr) | 70.6 | 68.8 | 11.2 | 36.6 | 13.1 |
| Kissengen (Rokoczy) | 85.6 | 41.8 | ..... | 4.5 | 44.7 |
| Vichy (Grand Gille) | 40.8 | 13.1 | 27 | 2.3 | 4.1 |

The composition of the Luciusquelle, at Tarasp, agrees, therefore, pretty closely with that of the Carlsbad waters, though in bicarbonate of soda, chloride of sodium, and in carbonic acid it exceeds both Carlsbad and Marienbad. In chloride of sodium it is only one-third behind Kissengen, and thus the constituent elements of the Luciusquelle combine the pharmaco-dynamic conditions of Carlsbad, Marienbad, and Kissengen, the amount of bicarbonate of soda being equal.

The physiological effects of the Luciusquelle are seen in increased secretion of juice by the stomach and intestines, as well as in their increased peristaltic action, in the liquefaction and facilitated removal of their contents by regulation of the evacuations, thereby raising the propulsive force of the portal vein, in relieving venous stases and in regulating the circulation in the abdominal regions. As a consequence, assimilation is improved and the body receives an increase of nutriment. By neutralization of the urine and liquefaction of the mucus in the urinary organs, any catarrh of the renal cavity or of the bladder is alleviated, while the diuresis is correspondingly increased.

Experience shows that the Luciusquelle is of peculiar efficacy in the following diseases:

(1) *Diseases of the digestive organs.*—Chronic catarrh of the stomach, dyspepsia, perforating ulcer of the stomach, gastralgia, chronic catarrh of the bowels, habitual constipation, chronic hyperæmia of the liver, fatty degeneration of the liver; catarrhal inflammation of the gall ducts, gallstones, chronic spleen, tumors (especially enlargement of the spleen following malaria or long-standing typhus).

(2) *General anomalies of nutrition.*—Obesity, scrofula, chlorosis, anæmia, diabtes, gout.

(3) *Diseases of the locomotive organs.*—Chronic rheumatism of the muscles and joints.

(4) *Diseases of women.*—Chronic catarrh of the vagina and the uterus, chronic metritis, para and perimetritis, irregular menstruation, suffering at the climateric age, sterility.

(5) *Nervous complaints.*—Chronic hyperæmia of the brain, hypochondria, hysteria, sick headache, excessive nervousness from physical or mental overexertion (especially when accompanied by neurasthenia).

(6) *Diseases of the respiratory organs.*—Chronic laryngeal and bronchial catarrh, old pleuritic exudations, chronic emphysema of the lungs and asthma.

(7) *Diseases of the urinary organs.*—Chronic catarrh of the bladder, lighter forms of Bright's disease; catarrh of the kidney, pelvis, and bladder; gravel, and stone in the kidneys.

(8) *Heart disease.*—Fatty degeneration of the heart and slight hypertrophy of the heart.

(9) *Diseases of the eye and ear.*—Chronic inflammation of the eyes and subjective affections of hearing, if at the same time there are obstructions in the abdominal organs.

*Counter indications.*—Advanced stages of pulmonary phthisis, cachectic states, carcinoma, severe heart troubles, shrunken kidneys, with severe hypertrophy of the heart, epilepsy, pregnancy.

*Directions for use.*—The proper mode of employing the waters during a course of treatment at home, as well as the diet to be adopted, depends entirely upon the individual malady; so that it is absolutely necessary to consult the family doctor or the physician who has had charge of the case before using the waters. Here a few general hints may be given. In most cases, it is advisable to take the water cold before breakfast; but where the water is found to be too cold for the stomach to bear, the former may be sufficiently warmed either by standing the glass containing it in a basin of hot water or by adding hot milk. The extraordinary amount of carbonic acid contained in the water of the Luciusquelle renders this method of warming it quite free from objection. Where the object is chiefly to effect a regular evacuation of the contents of the stomach and intestines, it is advisable to drink from half a bottle to a bottle in large doses—that is, in glassfuls, at intervals of fifteen minutes to half an hour, taking meanwhile gentle exercise. On the other hand, where it is desired to effect a complete absorption of the water and its salts into the blood, a thorough cleansing of the urinary organs, and an increase of diuresis, the water must be taken in smaller but more frequently repeated doses—one-half to one bottle in one-fourth to one-half glassfuls at intervals of ten minutes.

With respect to diet, the general advice may be given to strictly avoid during treatment all foods difficult of digestion or likely to irritate the digestive organs, as well as strong alcoholic drinks, liquors, etc., though well-fermented beer and good wine in moderate quantities are permissible.

In case the remainder of a bottle is to be put aside for use on the following day, it is advisable, in order to prevent the escape of the gas contained in the mineral water, to cork the bottle with a new cork free from holes and place it neck downward in a jug half full of cold water, which should be stood in some cool place.

The water is supplied in cases of 50 large, 30 small, 24 small, 12 large, or 12 small bottles by the company.

The price of the water in bottles at the spring is as follows:

| | Francs. |
|---|---|
| 50 large bottles | 26=$5.00 |
| 30 large bottles | 17= 3.28 |
| 30 small bottles | 14= 2.70 |

From a little brochure, I quote the following description of the by-products of the spring and the cost thereof in Switzerland:

By evaporation of the water of the Luciusquelle Spring, at Tarasp, the following natural products of the spring are prepared under the constant supervision of the management:

(1) Tarasp salts, now often added to strengthen the efficacy of our Luciusquelle Spring, are also used with advantage for a complete course of treatment by the daily administration of smaller doses.

(2) Tarasp lozenges, prepared from the above-mentioned salts, are efficacious and chiefly recommended in dyspeptic complaints and catarrhal affections of the bronchiæ and larynx.

(3) Tarasp effervescing powders, prepared from the salt mentioned under No. 1, with the addition of proportional doses of tartaric acid, make an agreeable beverage and not only give temporary relief from attacks of constipation, but also are adapted to a long course of treatment for most of the chronic disorders of the digestive organs, etc.

*Detailed prices in Switzerland.*

| | Francs. | |
|---|---|---|
| Large bottle of salts (120 gr.) | 3.00 | =$0.58 |
| Small bottle of salts (70 gr.) | 2.00 | = .38 |
| Bottle of pastilles | 1.25 | = .24 |
| Large box of powders | 3.00 | = .58 |
| Small box of powders | 1.75 | = .33 |

Special prospectuses and directions for using the product of the spring are sent, when desired, gratis and post free, by the management.

During the season, which lasts from June 1 to September 15, hundreds of foreigners of all nationalities are to be found at the sanatorium. They repair thither not only for the purpose of taking the waters, but for the exhilarating climate for which the place is noted and for the beauty of the scenery.

The quantity of the water exported in bottles, as well as of the by-products of the spring, has not been given me, but it appears on record at this office that small shipments to the United States have been made from time to time; the total amount exported thither during the past five or six years, however, will not exceed $3,000.

HENRY H. MORGAN,

AARAU, *March 16 and April 7, 1900.* *Consul.*

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## GENEVA.

On investigation I regret to say that there is little of interest or value to report on this subject. There are numerous bathing establishments in French Switzerland, but the drinking spas are limited. There is no exportation of mineral water to the United States, and very little to other countries. The Canton of Geneva possesses only three mineral-water springs. The first of these is the Marsis

Spring, in the Parc des Eaux-Vives, a fine wooded park just outside the corporate limits of Geneva. Marsis water resembles very closely the famous spring at the baths of Evian (commercially known as Eau d'Evian), which is located on the banks of Lake Geneva in the Department of Haute-Savoy, France. It is a cold alkaline water, very agreeable to the taste—much the same, indeed, as our own pure limestone waters—and is held to be efficacious in the treatment of all troubles of the urinary organs and is recommended for calculus and simular troubles. In short, it is claimed to be a fine dissolvent. Marsis is a comparatively new spring and has just begun to be exploited. It will become popular, no doubt, because as above stated it is identical with the famous Evian water.

*Analysis of Marsis water.*

| | Grams. |
|---|---|
| Dissolved gas: | |
| Nitrogen | 0.01327 |
| Oxygen | 0.00658 |
| Acids (calculated as anhydrides): | |
| Carbonic (total) | 0.33685 |
| Sulphuric | 0.03376 |
| Nitric | Traces. |
| Phosphoric | 0.08019 |
| Chlorine | 0.00939 |
| Bases (calculated as oxides): | |
| Potash ($K_2O$) | 0.00583 |
| Soda ($Na_2O$) | 0.00879 |
| Ammonia | Traces. |
| Lime (CaO) | 0.1831 |
| Aluminia ($Al_2O_3$) | 0.00103 |
| Iron sesquioxide ($Fe_2Oo_3$) | |
| Magnesia (MgO) | 0.02638 |
| Manganese (MnO) | Traces. |
| Organic substances | Slight quantity. |
| Silica ($SiO_2$) | 0.013 |
| Total | 0.63825 |

Marsis is bottled at the spring. Its retail price is 18 cents a bottle (1 quart). It is sold in glass demijohns at 4 cents a liter. There is as yet no exportation of this water, although great things are expected of it.

"La croix-de-Rozon" (the Cross of Rozon) is a mineral spring situated near Geneva at the foot of Mount Salève, on the frontier of Haute-Savoy. It is slightly alkaline, with bicarbonates and magnesia. The water is not widely known and is not at all exported. It is held to be very digestible and is used against obesity, gout, and urinal affections. There is a similar small spring at the village of Hermance, near Geneva.

The two mineral springs in French Switzerland most important

for drinking water are those of Montreux and Romanel. The Montreux Spring is located above the village of Montreux, which is a famous autumn and spring resort at the east end of Lake Geneva. Montreux water is also declared to be very similar to that of Evian, which is about 16 miles distant on the Savoy shore of the lake, as above stated. It is light, cold, clear, very digestible, and, as in the case of Evian and Marsis, is declared to be particularly efficacious in troubles of the bladder and kidneys. Evian water is so famous for these troubles and is really so efficacious in the treatment of catarrh of the bladder that I append the analysis:

*Analysis of Evian water.*

| | Grams. |
|---|---|
| Dissolved gas: | |
| Nitrogen | 0.0201 |
| Oxygen | 0.00788 |
| Acids: | |
| Carbonic (total) | 0.2901 |
| Sulphuric | 0.0054 |
| Nitric | 0.0038 |
| Phosphoric | 0.0003 |
| Chlorin | 0.00063 |
| Bases: | |
| Potash | 0.00201 |
| Soda | 0.0066 |
| Ammonia | 0.0001 |
| Magnesia | 0.03595 |
| Lime | 0.11007 |
| Alumina | 0.002 |
| Iron sesquioxide | 0.00127 |
| Manganese | Traces. |
| Glarin | 0.0146 |
| Silica | 0.01002 |
| Total | 0.51083 |

The Montreux analysis is very similar.

Montreux water may be bought all over French Switzerland, in bottles and half bottles, but it is very little known out of Switzerland. It is rapidly growing in popularity, however, and William Pictet, the famous Geneva mineral-water expert, believes that it will eventually be largely exported. This water is bottled at the spring in large quantities, and some of it is charged with carbonic-acid gas to suit the taste of persons who like gaseous waters. The retail price is 10 cents a bottle. It is sold in glass demijohns at 3 cents a liter (1.05 quarts).

Romanel is a large spring at the village of Romanel near the city of Lausanne, in the Canton of Vaud. It is about three times stronger in alkaline properties than Montreux or Evian water and is a famous table drink, being used in nearly every home at Lausanne. It is also almost exclusively sold as a drinking water in the dining

cars of the Jura-Simplon Railroad, the great railway system of French Switzerland. It is not generally used for medicinal purposes, but is often prescribed for troubles of the bladder and kidneys. Its price is the same as that of Montreux, and it is sometimes treated with carbonic-acid gas in the same way and for the same purpose.

The waters of Saxon-les-Bains, Lavey-les-Bains, Louëche-les-Bains, and Morgins-les-Bains are all more or less used for drinking purposes by the visitors who go to those bathing establishments, but none of them is known in the commerce of mineral waters for export. The waters of Saxon-les-Bains were exported some years ago, but since the Confederation closed the great gambling casino at that one-time famous resort, it has sunk into almost complete obscurity.

The warm mineral waters of Louëche-les-Bains are famously efficacious in skin diseases and other scrofulous troubles, and many thousands of invalids resort to them every summer; but they are used only for bathing.

It may be interesting in this connection to know what mineral waters are most largely imported into French Switzerland for medicinal purposes. The waters of Vichy (the Celestine and Grande-Grille springs); the St. John Spring, of Vals, France; the St. Leger Spring, of Pougues, France; the Grande Source, of Vittel, France; the famous waters for diabetes, gravel, etc., of Contrexéville, France; as well as the Hunyadi-Janos (bitter purgative water of Hungary)—are all highly appreciated and largely drunk in Switzerland.

Of these, the waters most used here are those of Vichy—the Celestine Spring for kidneys and bladder and the Grande-Grille for troubles of the liver and stomach. Another water much consumed in Switzerland is the famous Ems water of Germany. This is much prescribed for all troubles of the throat and chest. It is considered here almost a specific for colds on the chest when drunk in equal parts with warm milk.

Evian water, which has an enormous sale all over French Switzerland and France, is gaining in popularity and appears to be valuable in bladder and kidney troubles. I have known many cases of catarrh of the bladder benefited by it. The water is sold at the spring in glass demijohns at about 4 cents a liter; in cases of quarts, at 10 cents a bottle. It may be exported and kept indefinitely without impairing its value. Its retail price is 13 cents a bottle.

Vichy, Vittel, Pougues, Vals, and other similar waters retail at from 16 to 19 cents a bottle. Local importers sell them by wholesale to drug stores and other dealers at about 13 cents a bottle. The popular retail price of Hunyadi in Geneva is 14 cents a bottle.

The most important general agent in Geneva for all the waters named in this report is William Pictet, Place du Molard. American merchants or others interested may address themselves to Mr. Pictet with confidence in his responsibility, as well as in his knowledge as a mineral-water expert.

BENJ. H. RIDGELY,
*Consul.*

GENEVA, *March 28, 1900.*

## ST. GALL.

There are but few mineral sources of importance in this consular district, and but small amounts are prepared for exportation. The total amount (in value) of mineral water exported from Switzerland of which the bureau of statistics gives any record was in 1898—only $25,000 worth, most of which went to France, Germany, and Austria. There are only six places in this consular district where mineral water is bottled for the market, the water being taken direct from the springs without any artificial manipulation. These places are: Tarasp, in the lower Engadine; Passugg, Fideris, Sassal, and St. Moritz—all in the Canton of Graubunden; and Ragatz, in the Canton of St. Gall. There are other springs, but of no special importance.

Tarasp-Schuls is picturesquely situated in the lower Engadine, only a few miles from the borders of Tyrol. In all, there are twenty springs near this place, four of which are soda and four iron. A large and commodious hotel has been erected for the accommodation of guests, who tarry there in considerable numbers during the summer season. The elevation above sea level is about 3,600 feet. Of the springs at Tarasp, the Lucius is the most popular for bathing and drinking purposes, and some of this water is bottled for export; but the export trade is not large. The temperature of the water is 6.7° C. and the water is bottled direct from the springs.

Passugg is located 2,800 feet above sea level, in the Canton of Graubunden, and has a large establishment for the accommodation of summer guests. The soda springs in use are three in number and are claimed to be beneficial for stomach, liver, bronchial, bladder complaints, and rheumatism. The waters of Passugg are bottled direct from the springs, and are exported to a small extent. The water is popular throughout eastern Switzerland as a table drink and is a good substitute for Apollinaris and Selters. The Sassal springs, situated about 2,000 feet above sea level, are not far from Chur, the capital of the Canton of Graubunden. The principal ingredients are iron, chloride of soda, and magnesia. The water is recommended for dyspepsia, catarrh, and anæmia. This water has

not a very large sale, and the arrangements for guests are of a primitive nature.

Fideris, in the Graubunden Canton, is situated about 2,200 feet above the sea level. The waters are of a chalybeate character and are popular as a table drink. The temperature is 7.5° C. They are recommended for anæmia, chronic catarrh, bronchial troubles, and kidney complaints. The water is bottled and sold to some extent on the Swiss market, but not much of it is exported.

St. Moritz is by far the most celebrated of all these mineral-water places, and it is not so much noted for its waters as for the fine air and scenery of the Engadine. In recent years, St. Moritz has become the most fashionable and popular of all the mountain resorts of Switzerland. People go to Davos in order to live at all. Most people go to St. Moritz in order to get as much out of life as possible. It has some of the largest and most elegantly appointed hotels in Switzerland, and in the high season—between June and September—the place is crowded with visitors. Three chalybeate springs, situated 1,768 meters (5,800 feet) above sea level, are used for bathing and drinking purposes, and some of the water is bottled for export. The temperature is 5.3° C. The waters are said to be efficacious in all cases of dyspepsia, anæmia, chronic catarrh, neuralgia, and are said to be especially beneficial for those troubled with weak lungs and sensitive throats.

At Ragaz, in the Canton of St. Gall, is one of the best-known springs in Switzerland. The temperature of the water at the source is about 36° C. Soda and magnesia are the principal ingredients, and the water is recommended especially as a remedy for rheumatism. Ragaz is situated in the Upper Rhine Valley, 521 meters above sea level, surrounded by high and rugged mountains. Much has been done to make the place attractive for summer guests. The famous Tamina Gorge opens out into the Rhine Valley at Ragaz, and at the upper end of this gorge is the famous Pfaffers bath, located very near the great mineral spring.

As none of these waters is used to any extent for exportation, it is not considered worth while to go into details concerning them. As far as can be ascertained, none is sent to the United States.

JAMES T. DUBOIS,
*Consul-General.*

ST. GALL, *March 19, 1900.*

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## ZURICH.

Consul Lieberknecht writes under date of March 29, 1900, that there are no mineral springs in that district, but mineral water is freely used in the hotels, boarding houses, and saloons, being imported from Austria, Germany, France, and other European countries.

# UNITED KINGDOM.

## ENGLAND.

There are widely known mineral springs in the Sheffield consular district, at Buxton. The waters are of the uniform temperature of 82° F. and are obtained at (1) the pump room (St. Ann's Well), where the waters for drinking are dispensed; (2) the public pump adjoining; and (3) the baths.

The pump room is now under the management of the urban district council. The structure measures 55 by 25 feet. It is an elegant room, finished with stone, having a polished counter with a top of veined Italian marble, upon which are fixed five massive silvered fountains, through which the water flows continuously during the time the well is open to visitors. The outside pump is at the west end of the pump room; it is fed from the same source and has a first supply, secured to it by act of Parliament, for free use by the public as long as the spring flows. The baths are the property of the Duke of Devonshire; they are of two kinds—natural mineral water and hot baths.

The waters are bright, soft, and clear, and when seen in mass are of a light-blue color. They are famed for the cure of gout, rheumatism, sciatica, and lumbago, and are efficacious in affections of the stomach, bladder, liver, kidneys, and nerves.

Analyses of these natural mineral waters have been made, one of the latest resulting, per imperial gallon, as follows:

| | Grains. |
|---|---|
| Chloride of sodium | 4. 51717 |
| Sulphate of soda | 0. 20203 |
| Sulphate of potash | 0. 66896 |
| Sulphate of ammonium | 0. 01564 |
| Sulphate of lime | 0. 67364 |
| Nitrate of lime | 0. 2566 |
| Carbonate of lime | 9. 18584 |
| Carbonate of magnesia | 4. 72693 |
| Carbonate of iron | 0. 03709 |
| Carbonate of manganese | 0. 00847 |
| Silica | 0. 83769 |
| Total | 21. 13006 |
| Phosphoric acid | Trace. |
| Iodine | Trace. |
| Lithia | Trace. |

In addition to the above saline and other constituents, the water contains large quantities of free nitrogen gas, and the existence of argon and helium has recently been discovered.

The charge for the waters at St. Ann's Well is by ticket, 2 cents each, seven for 12 cents, and fifteen for 24 cents. One ticket is used for each visit. A charge is made for each bath.

It is estimated that more than 1,000,000 glasses of the waters are drunk medicinally every year, and that the average number of baths given during the past twenty years equals 62,867 per annum.

The waters are not bottled for export, as the gases contained therein are lost if the waters are not drunk as soon as they are taken from the spring.

There are other natural springs, some of a petrifying character, at Matlock; but no trade is done, the springs being chiefly objects of visit.

An analysis of the thermal water at Matlock Bath is given below, expressed in parts per 100,000:

| | |
|---|---|
| Total solid matters | 47.84 |
| Organic carbon | 0.021 |
| Organic nitrogen | 0.002 |
| Nitrogen as nitrates and nitrites | 0.03 |
| Total combined nitrogen | 0.032 |
| Chlorine | 4.1 |
| Hardness: | |
| Temporary | 1.88 |
| Permanent | 15.3 |

*Remarks.*—Clear, palatable, no poisonous metals; lime (total), 11.37 parts; magnesia (total), 4.08 parts.

It may be stated that these natural mineral springs are of large capacity and at one of the outlets—the Fountain Baths—the waters flow at the rate of about 600,000 to 700,000 gallons daily. The water has a uniform temperature of 68° F.

Mention may be made of an artesian well—the waters of which overflow at the surface—which is owned by Messrs. S. H. Ward & Co., Limited, of Sheffield, and is used for trade purposes. The following analysis is given of the water:

| | Grains per gallon. |
|---|---|
| Sodium chloride | 3.23 |
| Sodium sulphate | 0.39 |
| Sodium carbonate | 30.95 |
| Potassium carbonate | 0.38 |
| Magnesium carbonate | 0.29 |
| Calcium carbonate | 0.62 |
| Silica, alumina, and iron | 0.26 |
| Total | 36.12 |

Volatile and organic matter decomposed in heating, nil.

The water is pumped direct from the supply into a carbonating plant and bottled under pressure in cork and glass stopper 6-ounce

and 10-ounce bottles, which are sold at 24 cents per dozen; and in quart siphons, which are sold at 12 cents each, a deposit of 49 cents being charged on the siphon itself until return is made.

This natural mineral water is bottled unfiltered, the water being clear, with the addition of other alkaline salts, and is supplied to the trade as soda water, seltzer water, potash water, and lithia.

The present pump capacity is 2,000 gallons per hour, and the temperature at bore hole is 52° F., which remains constant.

The boring of the well is principally through blue shale, 8 feet of sandstone being reached at a depth of 180 feet from the surface.

No trade is done with the United States.

JAMES JOHNSTON,

SHEFFIELD, *March 15 and May 7, 1900.* *Consul.*

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Consul Halstead writes from Birmingham, February 23, 1900, that no mineral waters are exported to the United States through his office.

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## IRELAND.

Consul Wilbour, of Dublin, March 30, 1900, reports:

In this district there are only two springs, or spas, of any importance, viz, Lucan Spa, situated about 10 miles from Dublin, and Lisdoonvarna, about 180 miles away.

The spa at Lucan, County Dublin, has been known for its valuable medical properties for more than one hundred and fifty years, having first been brought into notice in 1758. The sulphur water is a specific for rheumatism, gout, eczema, and some forms of liver troubles. It is efficacious in building up broken constitutions and in some forms of dyspepsia; also in strengthening the digestive organs. It is bottled at the springs and sold at 85 cents per dozen small bottles and $1.21 per dozen large bottles. While the sale is not large, it seems to be increasing. None of the water is exported.

Connected with the spa is a hotel with all modern improvements, including sulphur baths, for which the water is pumped into the hotel direct from the springs.

The inclosed circular contains analyses and reports on the Lucan springs by Sir Charles Cameron, Prof. Emerson Reynolds, and Dr. Charles R. C. Tichborne.

The Lisdoonvarna spas have been known for over sixty years. They are located in the west of Ireland, not far from Galway, on a slightly elevated plateau overlooking the River Gowlaun and about 10 miles from the Atlantic Ocean. There are both sulphur and

chalybeate springs, as is shown by the following analyses made by James Apjohn, M. D., professor of chemistry, Dublin University. The table shows the number of grains in an imperial gallon, which contains 70,000 grains.

*Rathbane Spring, Lisdoonvarna.*

| | Grains. |
|---|---|
| Silex | 1. 12 |
| Alumina | 0. 14 |
| Carbonate of iron | 3. 132 |
| Carbonate of lime | 9. 6 |
| Carbonate of magnesia | 0. 495 |
| Sulphate of lime | 6. 173 |
| Sulphate of magnesia | 2. 604 |
| Sulphate of potash | 0. 555 |
| Chloride of sodium | 4. 195 |
| Organic matter | 1. 1 |
| Total | 29. 114 |

*Goulaun sulphur spa, Lisdoonvarna.*

| | |
|---|---|
| Silex | 0. 71 |
| Alumina | 0. 23 |
| Carbonate of lime | 6. 3 |
| Carbonate of magnesia | 4. 704 |
| Sulphate of magnesia | 2. 52 |
| Carbonate of soda | 6. 657 |
| Carbonate of potash | 0. 09 |
| Organic matter | 0. 946 |
| Chloride of sodium | 3. 664 |
| Total | 26. 421 |

These waters, so far as can be learned, are not bottled nor sold. There are a number of hotels in the neighborhood of the spas that are much frequented by invalids desiring the tonic and curative benefits of iron or sulphur springs.

To the foregoing should be added a brief description of the "Well of St. Patrick," in Dublin. This well, or spring, was celebrated in the earliest times for its purity and medicinal qualities, and Irishmen made it a religious duty to drink of the spring on St. Patrick's day. After the Reformation—about the time of Queen Elizabeth—the location of the spring was lost, but tradition located it somewhere near the junction of what are now known as Leinster and Nassau streets.. It is now claimed that the old well has been rediscovered and the water is being used in the manufacture of ginger ale, soda water, lithia water, and sarsaparilla by Messrs. Cantrell & Cochrane, who ship a considerable quantity of their manufactures to the United States. This firm has under consideraion the subject of bottling the water from St. Patrick's Well and placing it on the market as a table water—similar to Apollinaris.

## ANALYSES OF LUCAN SPA.

### REPORT OF SIR CHARLES A. CAMERON, M. D. (1881).

*Composition of a specimen of water taken by me for the purpose of analysis from the sulphurated spa, Lucan.*

An imperial gallon (70,000 grains weight) contains the following, in grains:

| | |
|---|---|
| Total solid matters | 37.4 |
| Including— | |
| Albuminoid ammonia | 0.004 |
| Saline ammonia | 0.002 |
| Nitrogen in nitrates and nitrites | Traces. |
| Sulphate of calcium | 3.5 |
| Carbonate of sodium | 22 |
| Chlorine | 3.45 |
| (Equal to chloride of sodium, 5.95.) | |

This water is clear and sparkling, and, though the sample analyzed was taken on a very warm day, its temperature was low,

The water contains carbonic acid in great abundance. It also contains a considerable quantity of sulphureted hydrogen gas. The amount of this gas was determined at the spa, and it was found, by means of several carefully conducted experiments, to be at the rate of 2.71 cubic inches per imperial gallon of water. For example, though it contained a large amount of sulphureted hydrogen in solution, its flavor is by no means disagreeable. It contains a large amount of carbonic acid and has so low a temperature that on a warm day it would be quite an agreeable liquid to drink. I am clearly of opinion that for all medical purposes the spa water will be found to be sufficiently strong. I may add that it is quite free from sewage impurities.

### REPORT OF PROF. EMERSON REYNOLDS.

The following table (I) contains the statement of the results of the determinations of the several constituents in 100,000 parts of the water (*i. e.*, centigrams per liter):

TABLE I.—*Lucan sulphur spa (contents in parts per 100,000).*

| | |
|---|---|
| Calcium | 3.272 |
| Magnesium | 1.433 |
| Sodium | 13.495 |
| Potassium | 1.675 |
| Lithium | Traces. |
| Alumina (with traces of iron) | 1.008 |
| Carbonic acid, combined ($CO_3$) | 38.101 |
| Sulphuric acid, combined ($SO_4$) | 5.534 |
| Chlorine (with traces of iodine) | 4.83 |
| Sulphur, as alkaline sulphydrate | 0.38 |
| Silica | 1.105 |

*Gases in solution—cubic centimeters per liter.*

| | |
|---|---|
| Sulphureted hydrogen | 8.17 |
| Carbon dioxide | 41.06 |

In the next table (II) I give the composition of the water in the usual form, having distributed the bases and acids according to the well-known plan and stated the quantity of each body in grains per imperial gallon (*i. e.*, 70,000 grains).

TABLE II.—*Lucan sulphur spa (constituents stated in grains per imperial gallon of 70,000 grains).*

| | |
|---|---|
| Calcium carbonate | 1.69 |
| Magnesium carbonate | 3.605 |
| Calcium sulphate | 5.487 |
| Sodium bicarbonate ($NaHCO_3$) | 28.275 |
| Sodium chloride | 3.829 |
| Sodium sulphydrate | 0.451 |
| Potassium chloride | 2.239 |
| Lithium carbonate | Traces. |
| Alumina (with traces of iron) | 0.756 |
| Silica | 0.773 |

*Gases in solution—cubic centimeters per litre.*

| | |
|---|---|
| Sulphureted hydrogen | 8.17 |
| Carbon dioxide | 41.06 |

The taste of the sample was that common to all sulphureted waters, containing little saline matter, but was moderately brisk to the palate, while the reaction to test paper was distinctly alkaline, more especially after drying the paper.

The temperature of the water as it issued from the pump was 7° C. (46° F), that of the surrounding air being 12.2° C. (54° F.).

The analysis at the spring proved the presence of free carbon dioxide, as well as sulphureted hydrogen; also of alkaline sulphydrade and ready-formed sulphuric acid. Determinations of these were made or commenced on the spot. But neither at the spring nor in the laboratory did I detect any traces of thiosulphate in the fresh water, though the latter was formed in small quantity by secondary change on standing.

The water, when examined with a view to its sanitary condition, did not afford evidence of sewage contamination and was free from intrates, though traces of nitrates were found, as a matter of course.

I know that the Lisdoonvarna sulphur spa has proved a most useful aid to general medical treatment, and that many eminent physicians entertain a high opinion of its efficacy; but it is well that the medical profession in Dublin should know that a spa of superior strength and quality is to be had nearer home.

REPORT OF CHARLES R. C. TICHBORNE, LL. D., F. C. S., M. R. J. A., FOR DR. STONEY, LUCAN.

Date of report, January 18, 1884; mark, sample taken in October, 1883.

I have carefully examined the Lucan sulphur spa water with considerable interest. In my hands it gave the following results:

| | Grains. |
|---|---|
| Sodium bicarbonate | 28 |
| Sodium sulphydrate | 0.501 |
| Sodium chloride | 3.208 |
| Lithium chloride | 0.006 |
| Potassium chloride | 2.25 |
| Potassium sulphate | 1.23 |
| Calcium sulphate | 3.402 |
| Calcium carbonate | 1.302 |
| Magnesium carbonate | 3.601 |
| Alumina and iron | 0.8 |
| Silica | 0.61 |
| Organic nitrogen | Trace. |
| Total ingredients in the imperial gallon, dried at 212° F. | 44.91 |

Carbonic acid gas not determined.

Sulphureted hydrogen not determined.

As the water was examined from bottled samples sent from the spring, the gases were not determined.

This water has been carefully examined by me for indications of surface drainage or organic matter of a like nature. It is practically free from those impurities.

I consider the Lucan Spa one of the most important mineral springs in this country. It is a mild but decidedly alkaline sulphur water. As it contains a considerable proportion of its sulphur in the form of sulphydrate of sodium, its properties as a sulphurated water are very permanent. Vide my views upon this subject in my work on the Mineral Waters of Europe, page 168.

The Lucan Spa, although not so strong, may be classed with the celebrated sulphur springs of Aix la Chapelle or Weilbach. For internal administration their mildness would be rather an advantage, while its brisk character, from the carbonic-acid gas present, makes it a very pleasant water to take. It is evidently a water well suited for bottling and would retain its properties when not opened for some time.

REPORT OF DR. G. L. B. STONEY, L. R. C. S. J., ETC. (1890).

I have great pleasure in bearing testimony to the medical efficacy of the Lucan sulphur water, having taken special interest in it for the past eight years, and thus having had ample opportunity of testing it freely. I consider it specially useful in chronic rheumatism. I have seen several cases of long standing where the joints were badly affected succumb to its eliminating powers in a remarkably short time by merely partaking of the waters without baths (as, unfortunately, these were wanting, together with suitable accommodation). In eczema it is of great service, as also in gout and some forms of hepatic disease. It has a most marked effect in building up and invigorating broken constitutions and in cases of dyspepsia, as it strengthens the digestive organs. The action of this water is stimulant, mildly alterative, and slightly diaphoritic, and is of great service to children of a strumous taint having a tendency to worms.

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Consul Swiney writes from Cork, February 27, 1900, that there are no springs in that district the waters of which are bottled.

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## SCOTLAND.

The principal spa in the Dundee district is that of Strathpeffer. It is situated among woodland scenery at the head of the fertile valley of Strathpeffer, which stretches about 3 miles west from the town of Dingwall, in Rossshire. On account of the excellent quality and curative powers of the mineral waters, it holds a high position among the spas of this country. The springs are both sulphurous and chalybeate. Of the former, the water is said to be the strongest known in Britain, and, in the colder seasons of the year, to contain a quantity of sulphureted hydrogen gas equal to, if not exceeding, that of the sulphurous waters of France and Germany. An Edinburgh physician expresses the opinion that the Strathpeffer waters deserve a much wider celebrity than they have

hitherto enjoyed; that they are invaluable as a curative agent for chronic diseases of the skin, for rheumatism and gout; and that they act freely on the liver and kidneys. They are said to possess several valuable properties which do not belong to any other known sulphur spring. In 1892, a new and powerful spring was discovered and opened by the proprietress of the ground in which the spa is situated—the Countess of Cromartie. The baths comprise sulphur and pine baths, an inhalation chamber and Russian bath, douche baths with double Aix douche, and peat or moor baths heretofore sought by invalids in Germany. Skilled masseurs and masseuses are in attendance and the Nauheim baths are also given. The carbonated chalybeate is used as a tonic.

In the immediate vicinity of the spa there are numerous villas and hotels affording accommodation for visitors in quest of health or pleasure, or both. The place is becoming more and more frequented as its attractions become known. The leaflet from which the foregoing particulars are supplied is inclosed, giving a list of the rates charged for the different kinds of baths and for the drinking waters.

The export trade in these waters is very small, the principal sale being over the counter in glasses during the season beginning in April and continuing till the end of November.

There have been put out during the year 100 dozen bottles, and it is understood that the water is bottled for export in the condition in which it comes from the spring, without manipulation of any kind. On two occasions within recent years, shipments have been made to Canada, but never to the United States.

At Bridge-of-Earn, a small village 20 miles from Dundee, situated on a stream of that name a few miles above its confluence with the River Tay, are the Pitkeathly wells. There are five springs, all of them saline and all of different strengths. The weakest are said to be admirably adapted for table waters, and for this purpose are bottled pure from the springs and aërated. It is claimed for the strong springs that they have long been known for their curative effect in strumous or other constitutional ailments, such as gravel, etc., and the waters may be had in their natural condition or artificially aërated. For skin diseases, they are frequently used in baths. The wells are managed by the Pitkeathly Wells and Mineral Water Company, the sole lessee of the springs. Accommodation for visitors is found in hotels and lodgings, of which the city of Perth (about 4 miles distant) and the surrounding villages afford an ample supply.

Besides those to which attention has been directed, there are no other mineral-water springs of any note in this district.

JOHN C. HIGGINS,

DUNDEE, *April 19, 1900.* *Consul.*

SPA ESTABLISHMENT.

| | s. | d. | |
|---|---|---|---|
| Weekly tickets for the waters, etc., including pavilion | 3 | 6 | =$0.85 |
| Weekly tickets.....per day... | 0 | 6 | = .12 |

Tickets are renewed every Monday morning, and must be shown to attendant when called for.

*Charges for the baths.*

| Description. | Per bath. | | Attendance. | |
|---|---|---|---|---|
| | *s. d.* | | *Pence.* | |
| Peat bath, with douche | 4 0 | $0.97 | 6 | $0.12 |
| Sulphur bath (thermal) | 3 6 | .85 | 6 | .12 |
| Sulphur bath | 2 6 | .608 | 3 | .06 |
| Douche bath | 2 6 | .608 | 3 | .06 |
| Russian bath | 2 6 | .608 | 6 | .12 |
| Needle bath | 1 9 | .425 | 3 | .06 |
| Pine bath | 2 6 | .608 | 3 | .06 |
| Plain water bath | 1 0 | .243 | 3 | .06 |
| Dry packing | 1 0 | .243 | ..... | ..... |
| Inhalation (for a course of 12, 10s.) | 1 0 | .243 | 3 | .06 |
| Nauheim bath | 4 6 | 1.09 | 6 | .12 |
| Double Aix douche | 4 0 | .97 | 6 | .12 |

Every ninth bath is free.

The water will be forwarded to any quarter on application to the manager—

| | s. | d. | |
|---|---|---|---|
| In bottles.....per dozen... | 4 | 0 | =$0.97 |
| Bottles sent to be filled.....do..... | 2 | 6 | = .608 |
| In jars.....per gallon... | 1 | 0 | = .24 |
| Jars sent to be filled.....do..... | 0 | 9 | = .18 |

The packing cases are extra.

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## BRITISH INDIA.

Mineral springs of some kind occur in every part of India; but the only one, so far as I can discover, that is put to any commercial or medicinal use other than purely local is the Sitakund Spring of Moonghyr. I am informed that a firm in Calcutta manufactures a mineral water similar to soda water from that spring and sells it in bottles.

There are considerable quantities of mineral waters imported and consumed in India, principally from Germany.

In the Memoirs of the Geological Survey of India, three hundred and one hot mineral springs are described, but they are not used in a commercial way.

R. F. PATTERSON,
*Consul-General.*

CALCUTTA, *May 2, 1900.*

## JAPAN.

Two brands of Japanese mineral water, known as "Hirano" and "Tan San," are now prepared for the foreign market. They are very highly appreciated, and their sale is increasing in neighboring tropical countries and upon passenger vessels trading to the Orient.

Aside from the injection of carbonic-acid gas, there is little of their preparation for export to describe. They are usually sold in white-glass pint bottles, and the present prices are, for cases of four dozen, about $2.30 for pints and about $3.24 for quarts.

JOHN MCLEAN,
*Vice-Consul-General.*

YOKOHAMA, *April 25, 1900.*

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## SIBERIA.

There are about fifteen mineral springs in the Amur and Maritime provinces, and one noted sulphur spring near Nikolaefsk. The best spring is situated about 180 miles northeast of Vladivostock, at Smarkofka, off the line of the Ussuri Railroad. A branch road would be necessary to reach it and render it profitable. None of these springs is working now, because the party in possession of the most promising holds it under quasi-Government control and awaits a $50,000 subsidy.

The waters, according to my informant—an expert in such matters—are among the best in the world. In the sulphur spring there is said to be more iron than in the celebrated Carlsbad waters. This spring is especially noted for the quality of the water and the amount of gas obtainable.

No mineral water is exported from Vladivostock. There were until recently two mineral-water plants here; now, there is only one, because of the difficulty in competing with Japanese and German importations. There is a large and increasing consumption of all kinds of these waters. The main importers are the firms of Kunst & Albers, Germans, and Sigioora & Co., Japanese. The former firm, besides importing large quantities of Tan San water from Japan, controls most of the water brought here from the various German spas. Mineral waters and beer will continue to be consumed for a long time, as the water of Vladivostock is very bad. Two new breweries have been recently opened. The total importation of mineral waters of all kinds for the past year amounted to about 400,000 bottles. The mineral springs referred to, once opened

properly, could do an excellent business; for as soon as it became a paying matter a duty would be put on foreign waters.

There is no glass factory in these provinces; bottles, therefore, are to be had only by importation. A glass factory in connection with the mineral-water industry would doubtless prove a good investment and should not require more than $50,000 capital at the outside estimate. Part of this would go toward building a branch railroad. Of course, as in all mining and land exploitation, a Russian partner would be necessary.

RICHARD T. GREENER,
VLADIVOSTOCK, *May 20, 1900.* *Commercial Agent.*

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## TURKEY IN ASIA.

### SYRIA.

Consul Ravndal writes from Beirut, March 24, 1900:

Quite celebrated are the hot springs of Tiberias. They have a temperature of about 143° F. and contain sulphur and chloride of magnesium. The baths are used for chronic rheumatism and skin diseases.

East of the Sea of Tiberias are the famous hot springs of Gadara or Mekes, the sanatory properties of which are extolled by ancient writers and which are to this day visited by many persons during the season (April). Their temperature ranges between 80° and 120° F. They are of the same nature as those at Tiberias and are similarly used.

Hamamin Suleimani, east of the Dead Sea, temperature 137° F., according to Dr. George Post, of Beirut, is another well-known spring. There are many intensely saline springs along the banks of the Dead Sea, all cathartic and useful in torpor of liver, etc.

In Beirut, the natives frequent a spring called Ain-el-Muraiyiseh, which is very saline and is used for rheumatic complaints.

None of the above waters are bottled or exported except as curiosities by tourists.

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### PALESTINE.

Under date of April 26, 1900, Consul Merrill, of Jerusalem, says:

About 1,000 cases of 50 bottles each are imported into this consular district annually: St. Galmier, 300 cases; Giesshuebler, 100 cases; Vichy, 300 cases; Apollinaris, 200 cases; and 100 cases of several other varieties. These names are given in the order of cost, St. Galmier being the cheapest and Apollinaris costing the most.

St. Galmier and Vichy are brought from France, Giesshuebler from Austria, and Apollinaris from Germany via England.

Natives do not use these waters, unless ordered to do so by physicians. Foreign residents use them only to a limited extent. The consumption is confined almost wholly to hotels and travelers in their camps.

In Palestine, there are several hot sulphur springs which in ancient times served as health resorts, and it is supposed that there are springs of other sorts of water that have not been fully examined.

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### ASIA MINOR.

Consul Lane sends the following from Smyrna, May 26, 1900:

There are several springs in the vicinity of Smyrna which have an excellent reputation. One, known as Allacheer, is a most palatable water; another is situated at Legia, some miles south of this city. Here the water comes from the ground at a temperature of 120° to 125° F. and is said to be highly beneficial for various forms of rheumatism, gout, kidney and liver complaints.

Unfortunately, there are no exact analyses to be had of these waters.

---

## NEW SOUTH WALES.

There is very little aërated or mineral water exported from this colony. An artesian well is located at Dubbo, some 278 miles west of Sydney, the waters of which, it is claimed, have some merit. These are called "Zetz Spa," and efforts are being made to create a market in this and other countries.

The total export for 1898—last published entries—was 10,311 dozen bottles, valued at about $7,000. Outside of the Australasian colonies, there were exported to Fiji 1,042 dozen bottles; to Hongkong, 8 dozen; to New Guinea, 99 dozen; to Italy, 8 dozen; to New Caledonia, 50 dozen; and to South Sea Islands, 684 dozen.

This Zetz Spa water is managed by a limited-liability company, and considerable energy is displayed in its business affairs. The virtue of these waters for curative purposes is probably not very well established.

The consumption of aërated and mineral waters is increasing quite rapidly. For 1895, the importations were 15,636 dozen bottles, and for the three following years 23,892 dozen, 28,335 dozen, and 32,120 dozen bottles, respectively.

The importations from beyond the colonies for 1898 were: From Germany, 4,059 dozen; United Kingdom, 2,674 dozen; Japan, 2,611 dozen; France, 905 dozen; Spain, 874 dozen; and United States, 164 dozen bottles.

From the colony of Victoria, 10,227 dozen bottles of aërated water were imported in the same year and from Queensland 8,026 dozen bottles, mostly mineral waters called "Helidon Spa."

Owing to the large amount of gas and a weakness in the lower part of the neck of the bottle, there is a great waste in the Japanese water, and, unless this fault is remedied, there will probably not be much increase in the Australian trade in the famous Tan San.

GEO. W. BELL,
*Consul.*

SYDNEY, *April 3, 1900.*

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## NEW ZEALAND.

### PURIRI NATURAL MINERAL WATER.

New Zealand is gradually acquiring a reputation second to that of no country in the world for the medicinal properties of its mineral waters. One of the best known comes from the district of Puriri (after which the water takes its name), about 40 miles from Auckland. The springs are in a reserve of some 10 acres in extent on the farm of Mr. Arthur M. Myers (managing director and chief shareholder in the Campbell & Ehrenfried Company, Limited). For years before the Europeans made use of the water, the natives were accustomed to travel for many miles with the sole object of obtaining it, their faith in its efficacy being unlimited.

The water is strongly alkaline, beautifully clear and sparkling in appearance, and the taste is by no means unpleasant. Its temperature as it bubbles up from the springs is about 60° F. Its solid constituents per gallon are as follows:

| | Grains. |
|---|---|
| Soda | 199.01 |
| Potash | 2.587 |
| Lime | 11.08 |
| Magnesia | 8.008 |
| Iron | Traces. |
| Silicic acid | 2.772 |
| Sulphuric acid | 2.903 |
| Carbonic acid | 300.438 |
| Phosphoric acid | Traces. |
| Chlorine | 13.313 |
| Iodine | Traces. |
| Total | 530.119 |

These elements are probably combined in the following manner:

| | Grains. |
|---|---|
| Bicarbonate of soda | 452.393 |
| Bicarbonate of lime | 28.506 |
| Bicarbonate of magnesia | 25.625 |
| Chloride of sodium | 21.938 |
| Sulphate of potash | 4.938 |
| Sulphate of soda | 0.94 |
| Silicia | 2.772 |
| Iodide of magnesia | Traces. |
| Phosphate of soda | Traces. |

To most palates, the effect is that of a pleasing seltzer water, and, combined with a medicinal dose of sound brandy or whisky, the beverage, it is said, should satisfy the most fastidious. The water is exceedingly rich in alkaline salts, and as an antacid, a diuretic, and in larger doses a mild saline aperient, it should find numerous applications in the treatment of the dyspeptic, the rheumatic, the gouty, the obese, and sufferers from certain renal and vesical derangements.

Its output—the market for it being limited to Australasia at the present time—is about 250,000 bottles per annum, with an ever-increasing demand. The sale is conducted by agents appointed in various parts of Australasia, but so far no trade has been opened up with the United States. The water is sold in three kinds of bottles—pints, half pints, and "splits." The appearance of the label and bottle reflects great credit upon those concerned.

All medical men who have examined the water unite in eulogizing its excellent qualities, regarding it as quite equal and very similar to the famous Vichy waters.

### KAMO MINERAL WATER.

The township of Kamo is situate in a belt of limestone country, about 4 miles north of Whangarei, which, in turn, is 80 miles north of Auckland. The daily steamer service of the Northern Steamship Company connects the two towns.

The Kamo mineral-water springs are grouped in the property of the New Zealand Mineral Springs, Limited, about 1 mile beyond Kamo, on the main road to Hikurangi, famous for its coal seams.

Until quite recently, this property was held by several settlers, each of whom supplied the public with mineral-water baths and board and lodging; but all these different holdings have now been acquired by the New Zealand Mineral Springs, Limited. They comprise altogether about 120 acres of freehold land besides some Government leasehold, on which a dozen springs are known to exist.

The improvements are three good cottages, three apple orchards, four bath houses; farmyard requirements in stabling, barns, etc.; and the fencing, gates, and hedges necessary to inclose the house and make several paddocks.

The largest cottage, a modern building of nine rooms, is comfortably furnished and is used as the sanatorium; but the accomodation is insufficient for summer visitors, although the bedrooms, food, and attention are all that can be expected. The objects of the company are not only the maintenance and enlargement of the sanatorium, but also the bottling of the water for medicinal and table uses.

The analysis of the water, as supplied by a former proprietor, is as follows, per gallon:

| | Grains. |
|---|---|
| Silica | 10.08 |
| Alumina | Trace. |
| Oxide of iron | 0.28 |
| Carbonate of lime | 57.68 |
| Carbonate of magnesia | 17.05 |
| Bicarbonate of soda | 38.64 |
| Chloride of sodium | 38.01 |
| Chloride of potassium | 2.8 |
| Sulphates | Nil. |
| Boron | Traces. |
| Lithium | Traces. |
| Total solids | 164.36 |

The water has been highly recommended by the medical faculty for gout, rheumatism, and kindred complaints. At the springs, it contains a natural gas and maintains a temperature of 75° to 80°.

The water is bottled in Auckland, in order to save the heavy expense of sending bottles and cases, full and empty, backward and forward between Auckland and Whangarei, and this seems to be the best method for the present, though bottling at the springs will be attempted in the near future.

The water is shipped to Auckland in clean and water-tight casks, which are filled on the day of shipment, and, after being allowed to settle, is carefully filtered and bottled, being aërated with carbonic-acid gas after the same method as is used in the making of soda water. Wiring and labeling completes the work of bottling.

Kamo mineral water is already popular in New Zealand, but the concern is so new that agencies for the different districts are not yet fully arranged.

No water has yet been exported for sale to Australia, the United Kingdom, or America; but cases of samples are being sent, and the next six months should make a great change in the outlook of the proprietary company.

Kamo water is packed for shipment in cases containing 6 dozen pints or 10 dozen half pints. The price for pints is 4s. (97 cents) per dozen; for half pints, 3s. 6d. (84 cents) per dozen. A rebate is given for all bottles returned empty.

FRANK DILLINGHAM,

AUCKLAND, *July 6, 1900.* *Consul.*

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## VICTORIA.

Vice-Consul-General Stanford reports from Melbourne, May 7, 1900, that there are one or two mineral springs in the colony, but they are of very small commercial value. The waters are not bottled nor exported, and have only a small local sale.

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## MEXICO.

Consul-General Barlow, of Mexico, under date of March 1, 1900, says:

The mineral-spring waters of this Republic are largely patronized for bathing, as, for instance, those at Aguas Calientes and Puebla. Those at Tehuacan are used for bathing and drinking, being claimed to be a specific for stone in the bladder. I am unable to learn that any of the waters are being bottled for export to the United States or to any other country.

# INDEX.


| | Page. |
|---|---|
| Aarau | 185 |
| Aix la Chapelle | 131 |
| Alhama | 182 |
| Antwerp | 101 |
| Archena | 180 |
| Asia Minor | 208 |
| Athens | 154 |
| Auckland | 209 |
| Austria | 87 |
| Baden | 187 |
| Barcelona | 171 |
| Barlow, Andrew D. (consul-general, Mexico) | 212 |
| Beirut | 207 |
| Belgium | 99 |
| Bell, George W. (consul, Sydney) | 208 |
| Birmenstorf | 187 |
| Birmingham | 199 |
| Bohemia | 97 |
| Bordeaux | 105 |
| Bordewich, Henry (consul, Christiania) | 184 |
| Bowron, Joseph (consul, Carthagena) | 180 |
| Breslau | 137 |
| British India | 205 |
| Brundage, Frank M. (consul, Aix la Chapelle) | 131 |
| Brunot, Hilary S. (consul, St. Etienne) | 127 |
| Calcutta | 205 |
| Carthagena | 180 |
| Cassel | 141 |
| Catania | 170 |
| Chemnitz | 146 |
| Christiania | 184 |
| Coburg | 146 |
| Cole, Charles L. (consul-general, Dresden) | 147 |
| Copenhagen | 102 |
| Cork | 203 |
| Covert, John C. (consul, Lyons) | 106 |
| Denmark | 102 |
| Dillingham, Frank (consul, Auckland) | 209 |
| Dresden | 147 |
| Dublin | 199 |
| DuBois, James T. (consul-general, St. Gall) | 195 |
| Dundee | 203 |
| Düsseldorf | 147 |
| England | 197 |
| Erdman, C. W. (consul, Breslau) | 137 |
| Fortuna | 181 |

| | Page. |
|---|---|
| France | 102 |
| Frankfort | 149 |
| Geneva | 191 |
| Germany | 131 |
| Gowdy, John K. (consul-general, Paris) | 102 |
| Greece | 154 |
| Greener, Richard T. (commercial agent, Vladivostock) | 206 |
| Guenther, Richard (consul-general, Frankfort) | 149 |
| Halstead, Marshal (consul, Birmingham) | 199 |
| Heingartner, Alexander (consul, Catania) | 170 |
| Higgins, John C. (consul, Dundee) | 203 |
| Hughes, Oliver J. D. (consul, Coburg) | 146 |
| Hurst, Carl Bailey (consul-general, Vienna) | 87 |
| Ingersoll, J. C. (consul, Copenhagen) | 102 |
| Ireland | 199 |
| Italy | 156 |
| Japan | 206 |
| Jarvis, William (consul, Milan) | 159 |
| Jerusalem | 207 |
| Johnson, H. Abert (consul, Venice) | 171 |
| Johnston, James (consul, Sheffield) | 197 |
| Kothe, G. C. (consular agent, Cassel) | 141 |
| Lane, Rufus W. (consul, Smyrna) | 208 |
| Lay, Julius G. (consul-general, Barcelona) | 171 |
| Leghorn | 156 |
| Leipzig | 152 |
| Lieber, P. (consul, Düsseldorf) | 47 |
| Lieberknecht, Adam (consul, Zurich) | 196 |
| Liege | 99 |
| Lincoln, George F. (consul-general, Antwerp) | 101 |
| Luciusquelle | 188 |
| Lyons | 106 |
| McGinley, Daniel E. (consul, Athens) | 154 |
| McLean, John (vice-consul-general, Yokohama) | 206 |
| Mahin, Frank W. (consul, Reichenberg) | 97 |
| Marseilles | 107 |
| Melbourne | 212 |
| Merrill, Selah (consul, Jerusalem) | 207 |
| Mexico | 212 |
| Milan | 159 |
| Monaghan, J. F. (vice and acting consul, Chemnitz) | 146 |
| Morgan, Henry H. (consul, Aarau) | 185 |
| Mula | 182 |
| New South Wales | 208 |
| New Zealand | 209 |
| Nice | 125 |
| Norway | 184 |
| Nuremberg | 152 |
| Ozmun, Edward F. (consul, Stuttgart) | 153 |
| Palestine | 207 |
| Paris | 102 |
| Patterson, R. F. (consul-general, Calcutta) | 205 |

| | Page. |
|---|---|
| Prickitt, William A. (consul, Rheims) | 125 |
| Ravndal, G. B. (consul, Beirut) | 207 |
| Reichenberg | 97 |
| Rheims | 125 |
| Ridgely, Benjamin H. (consul, Geneva) | 191 |
| St. Etienne | 127 |
| St. Gall | 195 |
| Schinznach | 185 |
| Scotland | 203 |
| Sheffield | 197 |
| Siberia | 206 |
| Sicily | 170 |
| Skinner, Robert P. (consul, Marseilles) | 107 |
| Smith, James A. (consul, Leghorn) | 156 |
| Smyrna | 208 |
| Spain | 171 |
| Stanford, Thomas W. (vice-consul-general, Melbourne) | 212 |
| Stockholm | 183 |
| Stuttgart | 153 |
| Sweden | 183 |
| Swiney, Daniel (consul, Cork) | 203 |
| Switzerland | 185 |
| Sydney | 208 |
| Syria | 207 |
| Tourgée, Albion W. (consul, Bordeaux) | 105 |
| Turkey in Asia | 207 |
| United Kingdom | 197 |
| Van Buren, Harold S. (consul, Nice) | 125 |
| Venice | 171 |
| Victoria | 212 |
| Vienna | 87 |
| Vladivostock | 206 |
| Warner, Brainard H. (consul, Leipzig) | 152 |
| Weber, Gustav C. E. (consul, Nuremberg) | 152 |
| Wilbour, Joshua (consul, Dublin) | 199 |
| Winslow, Alfred A. (consul, Liege) | 99 |
| Winslow, Edward D. (consul-general, Stockholm) | 183 |
| Yokohama | 206 |
| Zurich | 196 |

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